Journal
OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

AVMA Convention—Cleveland, August 19-22, 1957

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Correspondence

June 20, 1957

Dear Dr. Aitken:

The June 15, 1957, issue of the *J.A.V.M.A.*, page 551, has an abstract from *Nature* on feeding dieldrin to chickens to achieve systemic control of lice. In view of the extreme toxicity of dieldrin to gallinaceous birds, this seems a highly questionable procedure.

I am, therefore, taking the liberty of enclosing a recent paper of our expert on this subject.

Sincerely yours,
s/William H. Stickel, Editor,
Wildlife Review.

An excerpt from J. B. DeWitt's article referred to above in *Agriculture and Food Chemistry* (Oct., 1956, p. 863) follows.—Ed.

> Inclusion of 1 p.p.m. of aldrin, dieldrin, or endrin in diets fed growing quail resulted in high mortality rates, but the birds survived on diets containing 100 p.p.m. of DDT or 50 p.p.m. of strobane. Young pheasants . . . failed to survive on diets containing 5 p.p.m. of aldrin, dieldrin, or endrin.
>
> Egg production, fertility, and hatchability were relatively unaffected . . . [in quail, but these] . . . chicks . . . showed high mortality rates even when reared on insecticide-free diets . . . [However] hatchability of pheasant eggs and viability of chicks were adversely affected . . . .

• • •

June 19, 1957

Dear Dr. Aitken:

I read with much interest the article by Parrish *et al.*, on "The Clinical Management of Snake Venom Poisoning in Domestic Animals" that appeared in the June 15, 1957, issue of the *J.A.V.M.A.*, page 548.

An article by Leapold *et al.*, entitled "An Evaluation of the Mechanical Treatment of Snake Bite," was published in the June, 1957, issue of *Military Medicine*, page 414. The striking difference in these two articles lies in the recommendations on mechanical treatment.

Whereas Parrish *et al.* state in their summary that "The use of a tourniquet and incision and suction are recommended as the first aid treatment of poisonous snake bites in animals," we find that the summary by Leapold *et al.* states: "(1) Immobilization appears to be helpful in the treatment of snake bite. (2) The tourniquet apparently does not increase or decrease survival time over that of immobilization. (3) Incision and suction not only fails to aid but in fact decreases the survival period."

This leaves the question of mechanical treatment somewhat confused and I feel that it should be clarified if possible.

Sincerely,
s/D. W. Bruner,
Ithaca, N. Y.

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News From Washington

Legislative Action.— H. R. 6814, **compulsory poultry inspection** (see JOURNAL June 15, 1957, adv. p. 18), passed the House July 9, 1957. In addition to several committee-perfecting amendments, the House adopted an amendment introduced by Representative Hoffman (R., Mich.) that this legislation is not to be construed so as to invalidate any state law unless they conflict. On July 15, 1957, under a suspension of the rules, the House passed S. 1747 (see JOURNAL, May 15, 1957, adv. p. 16) with an amendment. The latter is the House bill that passed July 9. This was a legislative procedure to expedite action by letting the bill go to conference.

Hearings were held on H. R. 5933, **hog-cholera virus** (see JOURNAL, April 15, 1957, adv. p. 12), on July 24 by the House Agriculture Subcommittee on Livestock and Feed Grains. **Dr. L. M. Hutchings,** Executive Board member, **appeared as AVMA witness supporting the principle of the proposed legislation** but recommended certain amendments to the bill.

The House Committee on Agriculture, on July 28, ordered favorably reported to the House, with minor amendments, **a humane slaughter bill, H. R. 8308.** The bill had been introduced by Representative Poage (D., Texas), chairman, Subcommittee on Livestock and Feed Grains, following hearings on several bills previously introduced (H. R. 176, H. R. 5820, et al.).

★ ★ ★ ★

New Bills Introduced.—H. Resolution 312 (Rep. Landrum, D., Ga.) would create a select committee to conduct studies and investigations of **all federal grants-in-aid.** The proposal was approved July 17, by the Rules Committee and is now pending in the House. This Resolution was introduced July 11, 1957.

H. R. 8563 (Rep. Sikes, D., Fla.) would appropriate $3,000,000 for use by the Secretary of Agriculture, in a cooperative program with Florida, for the control and eradication of screwworms.

S. 2408 (Senators Thye and Wiley, Minn., and Wis., respectively), among other programs, includes **funds for accelerated brucellosis eradication.** It is identical with H. R. 8152 (see JOURNAL, July 15, 1957, adv. p. 10).

S. 2481 (Sen. Langer, R., N. Dak.) would prohibit experiments upon living dogs in the District of Columbia.

★ ★ ★ ★

Miscellaneous.—Poultry Division, ARS, U. S. D. A., announced vacancies for qualified veterinarians in various sections of the U. S. Starting basic salary is $6,115 per annum for those with one year of professional experience. Those having less than one year experience start at $5,335, with promotion to GS-9 at $6,115 on successfully completing one year of service. No written examination is required. Also, there are part-time or seasonal openings available for veterinary inspectors.

★ ★ ★ ★

Military.—Third U. S. Army Headquarters, Fort McPherson, Ga., has announced the appointment of Dr. Thomas F. Fussell (GA '56) as first lieutenant, Veterinary Corps, and his assignment to active duty July 9, 1957, to Fifth U. S. Army Headquarters, V. F. I. S., Chicago, with station at Omaha, Neb.

Army Headquarters has authorized the **appointment and call to active duty of 23 veterinary officers.**

Air Force Headquarters has ordered ten veterinary officers to active duty, effective date Aug. 25, 1957. They will report to the Gunter Air Force Base, Montgomery, Ala., to take the basic orientation course for officers.

The Bureau of Medicine, including the **Veterinary Branch,** Food and Drug Administration, is now located at 501-E St., S. E., Washington 25, D. C.

Public Law 85-67, Title II thereof, contains the appropriations authorized for the Department of Health, Education, and Welfare, including that for the Public Health Service, for the fiscal year ending June 30, 1958.

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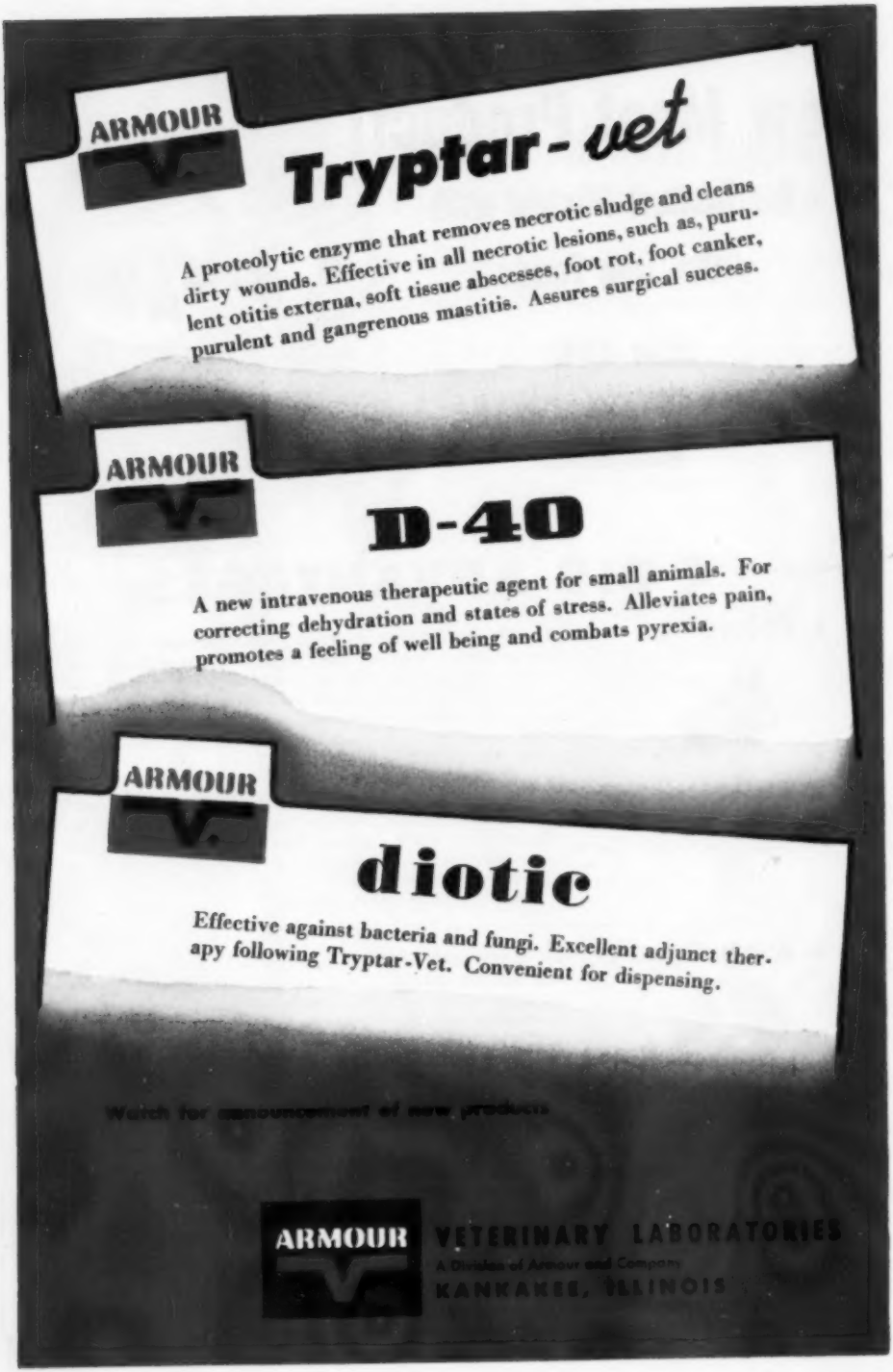
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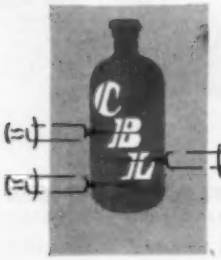

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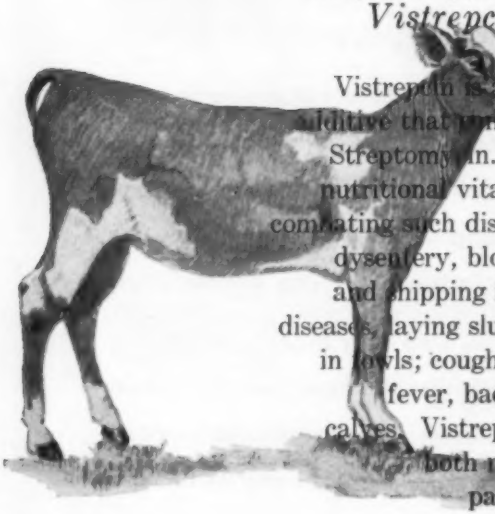

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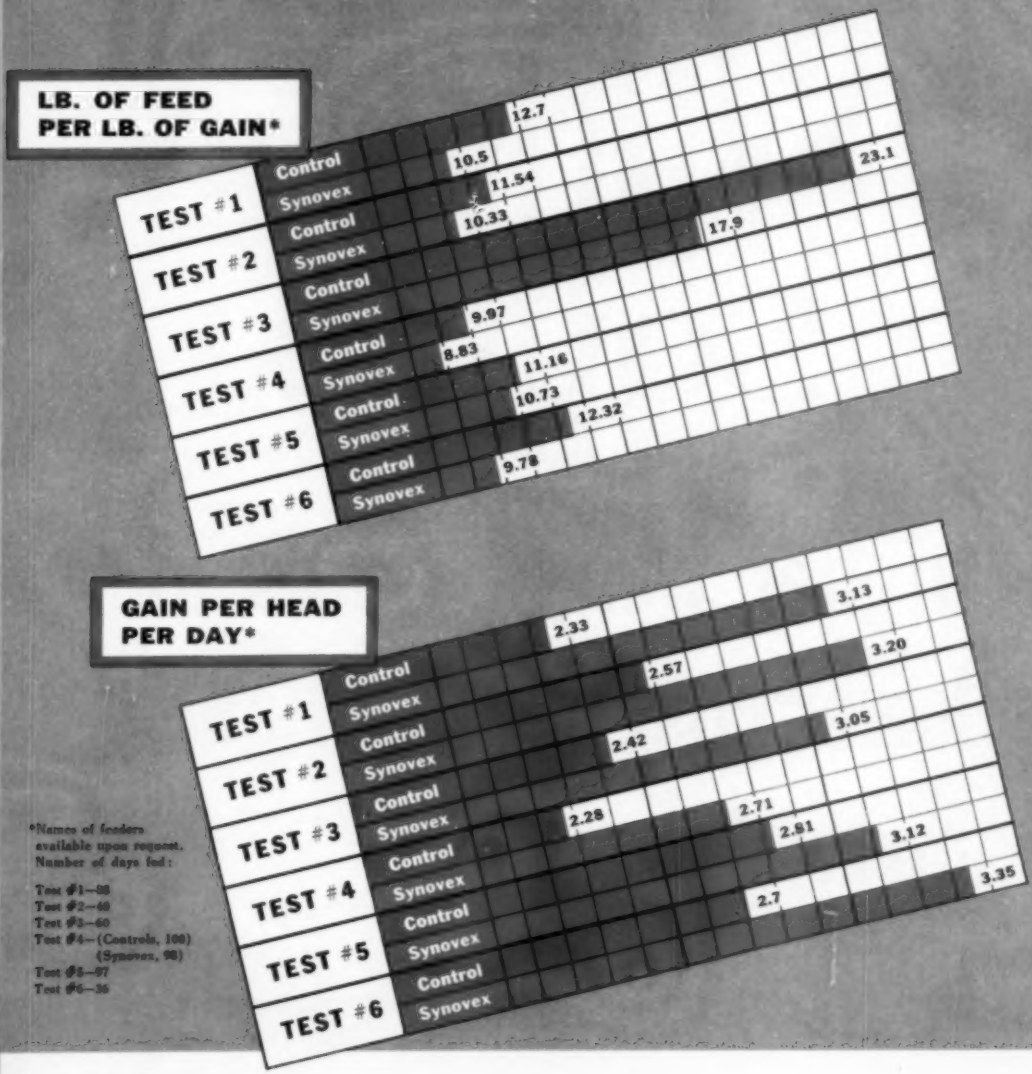

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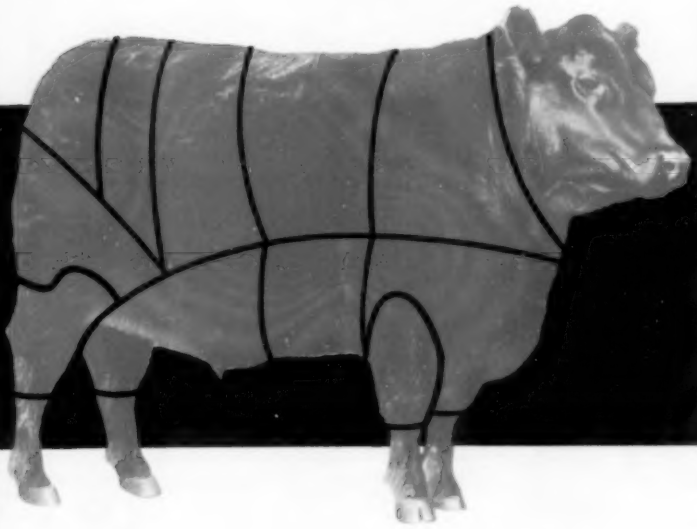
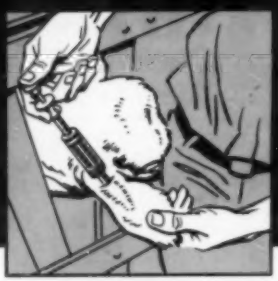


Insert plastic cartridge containing six pellets of Synovex into the shank of the implanter.



Nick through skin of ear with special scalpel, insert tip of implanter, press plunger to eject all 6 pellets of Synovex.

*R. J. Deans, W. J. Van Arsdell, E. P. Reineke and L. J. Bratzler (Michigan Agricultural Experiment Station): The Effect of Progesterone-Estradiol Implants and Stilbestrol Feeding on Feed Lot Performance and Carcass Characteristics of Steers, Journ. Animal Sci. 15:1020, 1956.

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REFERENCES: 1. Bull, W. S.: N. Amer. Vet., In press. 2. Henry, R. T., and Blackburn, E. G.: Vet. Med., In press.

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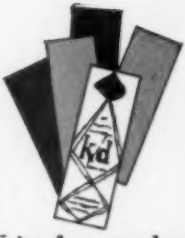

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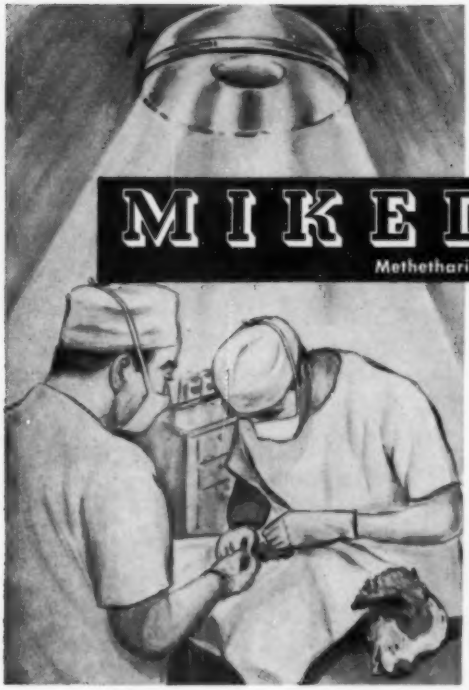

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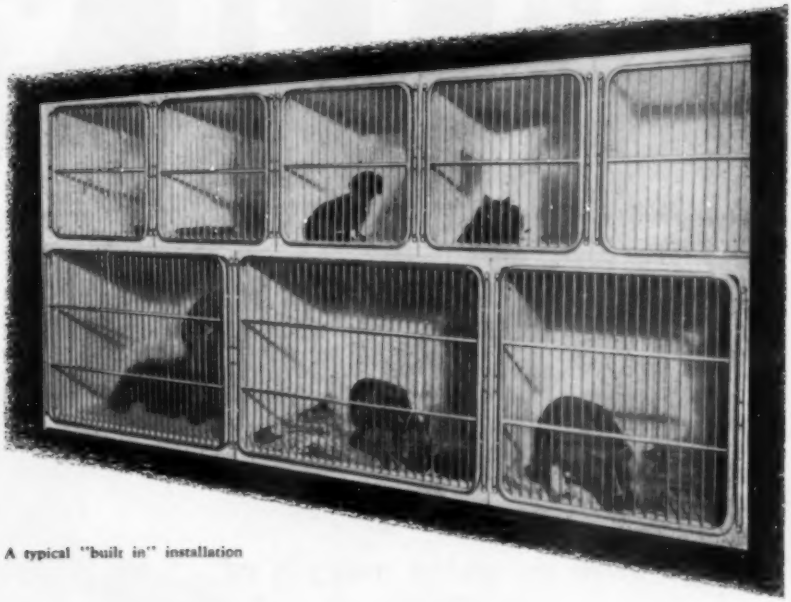

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Transthoracic Approach for Diaphragmatic Hernia Repair in Cats and Dogs

HUGH C. BUTLER, D.V.M.

Pullman, Washington

THE TWO standard approaches for the repair of diaphragmatic hernias in small animals are the lateral thoracic and the abdominal. Either method is usually satisfactory but both have some drawbacks because there often is insufficient exposure of the diaphragm and limited room for suturing. Both approaches have disadvantages if the diaphragm is ruptured at the costal margin; if there is a large rent in the diaphragm; or if the hernia has occurred in the area of the caval foramen, since it is often necessary to suture on three sides of the vena cava. In view of these difficulties, a transthoracic approach has been attempted since it provides a more extensive exposure.

The animal is prepared for surgery, anesthetized, a respiratory tube is introduced, and a positive-pressure, resuscitation breathing apparatus is applied. The animal is placed in a dorsal recumbent position to permit a complete transverse incision of the chest wall. The skin incision follows the intercostal spaces between the seventh and eighth ribs on both sides of the thoracic cage. This is a curved incision (fig. 1).

The intercostal tissues are then incised down to the pleura, care being taken to keep the incision midway between the ribs to avoid the intercostal vessels which run parallel to and immediately posterior to each rib. As the sternum is approached, care must be taken to locate and ligate the internal thoracic arteries and veins which lie lateral and parallel to the sternum, between the pleura and the ribs, on each side (fig. 2). After the hemorrhage is controlled, the pleura is incised to the sternum. The fluid which may be present in the pleural cavity is disposed of, and the sternum is cut transversely with bone cutters. This exposes the diaphragm. A retractor is usually not needed because the

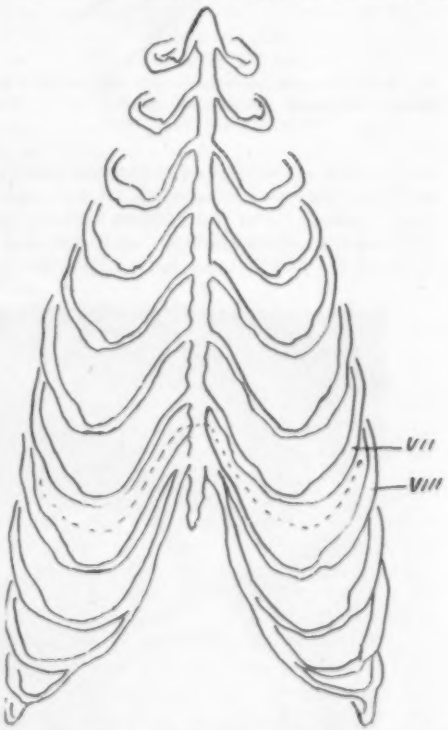

Fig. 1—A diagram of the sternum and ribs of a dog showing the position of the transverse incision along the spaces between the seventh and eighth ribs.

Dr. Butler is instructor in surgery in the Small Animal Clinic, College of Veterinary Medicine, State College of Washington, Pullman.

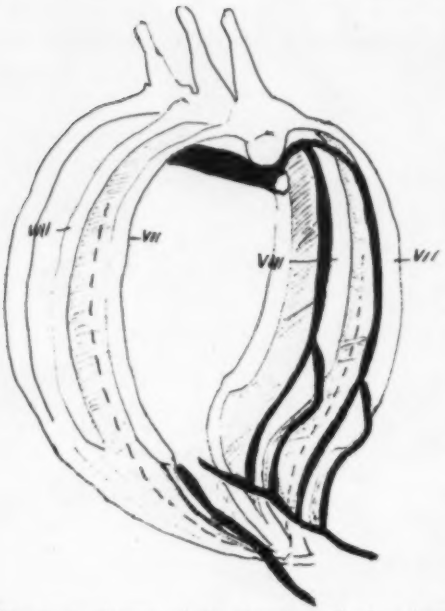

Fig. 2—A diagram of the thoracic wall of a dog showing the major blood vessels in the area of the incision through the sternum.

contraction of the rectus abdominis muscle will pull the xyphoid portion of the sternum caudally. Any interfering structures are readily manipulatable and the diaphragm can now be repaired with comparative ease. Using either of the two standard approaches, manipulation can be difficult and many times is impossible.

To close the thoracic cage, the severed ends of the sternum are brought into apposition with No. 26 stainless steel, parallel mattress sutures through the cartilage. The pleura and intercostal muscles are then closed simultaneously with a simple, continuous suture. Two or three No. 2 chromic catgut interrupted sutures are placed at regular intervals around the adjacent ribs to hold them in normal position.

Just prior to tightening the last few sutures in the muscle and pleura, a tube is inserted into the pleural cavity. The lungs are then expanded to expel air and the tube is quickly clamped and removed while tension is held on the sutures surrounding it. When the sutures are tied, the animal is taken off the forced respiration and observed for a few minutes to see if sufficient negative intrathoracic pressure has been established to allow for normal respiration. If so, the skin wound is sutured. If respiratory difficulty indicates that air remains within the pleural cavity, however, a 20-cc. syringe with a 22-gauge needle is used to withdraw sufficient air to create the necessary negative intrapleural pressure.

During the first few postoperative days, the animal should be confined in an effort to prevent strain on the sternal region.

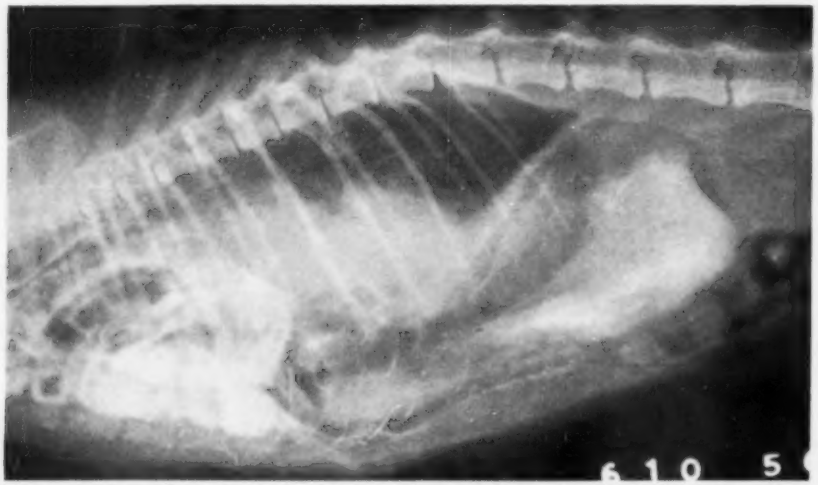

Fig. 3—A radiograph of the cat (lateral view) showing abdominal viscera as far anterior as the first rib.

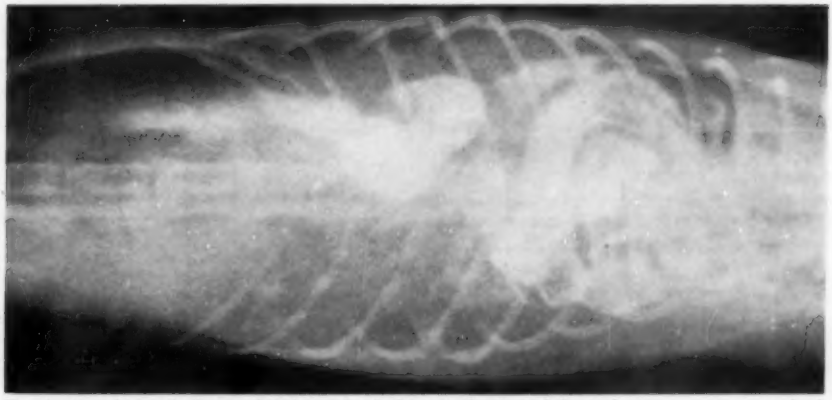

Fig. 4—A radiograph (ventrodorsal view) of the cat showing abdominal viscera present on both sides of the mediastinum.

CASE HISTORY

A female cat, 5 years old, had been sick for about one week, showing a temperature of 102.2 F., a discharge from the eyes, signs of anorexia, cachexia, dehydration, and severe dyspnea. Borborygmus was audible in the chest area. Radiographs (fig. 3, 4) indicated that a large portion of abdominal viscera was in the thoracic cavity. The animal was prepared for surgery under ether-oxygen, positive-pressure anesthesia by means of an endotracheal tube.

The hernia involved the tearing of the intercostal attachments of the diaphragm on both sides of the sternum, leaving the diaphragm attached to the body wall only dorsally. The liver, stomach, spleen, and part of the intestine were herniated. These were replaced and the diaphragm was repaired without difficulty.

Immediately following surgery, the animal was placed in an oxygen tent. On the third postoperative day, the body temperature rose to 103 F., and 250 mg. of oxytetracycline (Terramycin) was given twice daily *per os*. Otherwise, the postoperative treatment was routine. The cat was discharged on the seventh day and made a satisfactory recovery.

SUMMARY

A new, transthoracic approach is described for repair of a diaphragmatic hernia in the cat or dog. This approach gives increased exposure of the diaphragm and, in turn, it facilitates the surgical repair of the hernia.

BCG Vaccination in the United States.—Although the mortality due to tuberculosis in man in the United States has decreased markedly, morbidity remains high. Therefore, the Medical Advisory Committee of the Research Foundation recommends a greater use of BCG vaccination. Extended research in other countries indicates that it should be used in areas of high incidence and for individuals who will be unavoidably exposed (medical and nursing students, and for individuals in households with tuberculous persons, etc.), with revaccination at suitable intervals.—*J.Am.M.A. (June 29, 1957): 951.*

The Action of Tetanus Toxin.—Local tetanus can be produced in laboratory animals by the intramuscular or intraneural injection of toxin (1/200 to 1/50 m.l.d.). In two to four days, there will be a persistence of voluntary movement, then spasticity, and finally rigidity of the extremity injected. When the toxin is injected intraneurally, the effects appear first in muscles supplied by the nerve injected, then spread to other muscles whose innervation is supplied by adjacent spinal segments, even to those of the opposite extremities. The local tetanus persists for several weeks or months. Complex reflexes are profoundly affected in tetanus. The contraction of the flexor muscles is exaggerated, while the extensors contract instead of relaxing. This effect resembles that of strychnine. —*Proc. Mayo Clinic (April 3, 1957): 143.*

A Study of the Whey Plate Agglutination Test for Brucellosis

MARTIN H. ROEPKE, Ph.D.; FRANK C. STILES, Jr., D.V.M.;
THOMAS G. WHITE, M.S.; FRED C. DRIVER, D.V.M.

St. Paul, Minnesota

CONSIDERABLE INTEREST has been shown in various agglutination tests on milk of cattle for the diagnosis of brucellosis in the individual animal.

This preliminary study was initiated chiefly to compare the whey plate test[2-5] with the standard sero-agglutination test under the conditions prevailing in Minnesota. At the time the study was initiated, 76 of the 87 counties in the state had been certified as modified brucellosis-free areas. One or more county-wide blood tests had been completed in the remaining 11 counties. Blood-testing activities related primarily to the retest of reactor and suspicious herds and follow-up blood tests on ring-test suspicious herds.

Records of official calf vaccination between the ages of 6 and 8 months with *Brucella abortus* strain 19 vaccine for the preceding seven years suggest that probably not more than 20 per cent of the animals in production in the state were vaccinated as calves. Adult animal vaccination has been negligible.

MATERIALS AND METHODS

Blood samples and approximately 50-ml. amounts of aseptically collected individual quarter milk samples were obtained from 220 recently branded brucellosis reactor animals on a random basis as they arrived at the stockyards in South St. Paul. (A state law requires slaughter within 15 days of branding for indemnity purposes.) Recently branded animals were selected because it was felt that they were a uniform group as far as time of determination of infection was concerned. Also, it is assumed that newly infected animals are the most common type of reactor animals in this state in view of the extensive brucellosis control and eradication program, including semiannual ring tests. The reactors, which came from about three fourths of the counties in all sections of the state, represented significant variations as to degrees of prevalence of brucellosis, management conditions, and the use of *Br. abortus* strain 19 vaccine.

The blood serum was tested by the Brucella rapid plate test and the Brucella tube test using plate method antigen and tube method antigen, respectively. The milk was tested with Brucella ring test antigen by the milk plate test[1] and the whey plate test.[5] All antigens used were furnished by the Agricultural Research Service, U.S.D.A. The milk and whey titers were determined as any agglutination in the least amount of milk or whey, *i.e.*, 0.08 ml. of milk or whey = 1+; 0.04 ml. = 2+; 0.02 ml. = 3+; 0.01 ml. = 4+; and 0.005 ml. = 5+. The incubation period at room temperature for the whey plate test was six minutes with 14 minutes for the milk plate test. The longer incubation period for the latter test renders it a more sensitive test than the former.

On the basis of the above tests, 16 of the animals had serum titers below 1:100, so the milk samples were discarded. A later check of the records showed that most of these 16 animals had titers in the suspicious range on the field blood test but were diagnosed as reactors on the basis of clinical evidence of infection in the herd.

Of the 204 remaining reactor animals, milk from 112 was studied bacteriologically. The 92 not studied were in the whey plate test 4+ and 5+ titer groups. After obtaining a high percentage of Brucella isolations from 30 milk samples with 4+ and 5+ whey reactions, it was decided not worthwhile to culture more samples with high whey test titers. One wire loopful of cream from the quarter samples of milk from the above 30 cows and the 15 in the 3+ whey plate test titer group were studied by direct culture only, on an enriched tryptose agar medium developed by Goode.[6] To counteract possible contamination of the milk at the time of collection, another plate of the same medium with 1:650,000 parts of crystal violet added was also streaked with two loops of cream. As judged by the results obtained with the two types of mediums in cases where contamination was not significant, the latter medium appeared to be satisfactory in those instances (approx. 25% of the quarter samples) in which contamination was a problem with the former medium. The cultures were studied microscopically, using Huddleson's oblique light technique,[7] after suitable incubation. Suspicious colonies were Gram-stained and tested for biochemical reactions

Drs. Roepke and White are with the Division of Veterinary Bacteriology and Public Health, School of Veterinary Medicine, University of Minnesota, St. Paul. Drs. Stiles and Driver are with the Animal Disease Eradication Division, Agricultural Research Service, U. S. Department of Agriculture.

The authors thank the employees of the several commission companies at the Union Stockyards at South St. Paul for their cooperation.

Paper No. 3762, scientific journal series, Agricultural Experiment Station, University of Minnesota.

These studies were made possible, in part, by a grant from the Animal Disease and Parasite Research Division, Agricultural Research Service, U.S. Department of Agriculture.

TABLE 1—Comparison of Serum and Whey Plate Test Titers

Serum titer,* reciprocal of dilution	Whey plate test†						No. of animals
	Negative		Suspicious	Reactor			
	————‡	+————	++————	+++——	++++—	+++++	
100	23	2	1	2	3	2	33
200	16	3	9	3	6	10	49
400	2	—	2	—	5	5	14
800	1	2	2	7	8	25	45
1,600	1	—	—	3	4	28	36
3,200	1	—	—	—	—	20	21
6,400		—	—	—	—	2	2
12,800		—	—	—	—	3	3
25,600		—	—	—	—	1	1
No. of animals	44	9	14	15	26	96	204
Per cent of total	21.6	4.4	6.9	7.4	12.7	47.0	—

*The 100 and 200 titers are serum plate test titers and the remainder serum tube test titers.
†Interpretation of whey plate test titers as suggested by Cameron.[2]
‡Quantities of whey (0.08, 0.04, 0.02, 0.01, and 0.005 ml.)—the agglutination reactions were recorded as negative or positive for each dilution or quantity of whey.

and for agglutinating ability with anti-Brucella serums and negative serum controls.

The cream from the quarter samples of milk from the 67 cows with whey plate test titers of 2+ and lower was cultured directly and then pooled for each animal, and the skim milk was centrifuged at 7,000 r.p.m. for 15 minutes. The sediment was then suspended in the cream and 5-ml. aliquots inoculated intraperitoneally into 4 male guinea pigs. After four to five weeks, the guinea pigs were necropsied and mashed spleen tissue as well as pus from epididymal abscesses, if present, were cultured and tested in the same manner as for the cream.

RESULTS

The distribution of serum and whey plate test titers obtained on the 204 reactor animals studied is shown (table 1).

As shown in table 1, 26 per cent of the whey plate test titers were in the negative range and 6.9 per cent in the suspicious range as tentatively defined by Cameron.[2]

The results of the isolation attempts on the milk from 18 animals vaccinated as calves are summarized (table 2). The results in these animals were similar to those obtained for the nonvaccinated animals and, therefore, were included in the general summary (table 3).

Brucella organisms were isolated from the milk of 7 of 44 (15.9%) animals with serum titers in the reacting range (1:100 or higher for nonvaccinated and 1:200 or higher for vaccinated animals) on which negative whey plate tests were obtained. Isolations were obtained from 3 of 9 (33%) of the animals with 1+ whey plate reactions. If 1+ whey plate test reactions are interpreted as negative, the percentage of isolations from animals in the whey plate test negative group was 18.8 per cent. Isolations were made from the milk of 6 of 14 (42.8%) of the animals with whey plate test titers in the suspicious group (2+).

The agglutination tests on the 16 reactor animals in the whey plate test negative and suspicious groups on which Brucella isolations were made from the milk are shown (table 4).

TABLE 2—Brucella Isolation Studies on Milk from 18 Calf-Vaccinated Reactors

	Whey plate test titer					
	Negative	1+	2+	3+	4+	5+
No. animals cultured	7	1	2	3	2	3
No. Brucella isolations	1	0	1	1	1	3

As may be seen in table 4, the serum titers were in the 1:100 to 1:200 range for the 10 animals in the whey plate test neg-

TABLE 3—Brucella Isolation Studies on Milk from 112 Reactors

	Whey plate test titer					
	Negative	+	++	+++	++++	+++++
No. animals cultured	44	9	14	15	11	19
No. Brucella isolations	7	3	6	9	8	19
Per cent isolations	15.9%	33.0%	42.8%	60.0%	72.8%	100%
Negative range (%)		18.8%	———		———	
Suspicious range (%)		———	42.8%		———	
Reaction range (%)		———	———		80.0%	

TABLE 4—Brucella Agglutination Tests on Infected Animals with Whey Plate Test Negative or Suspicious Reactions

Animal No.	Serum titer	Whey plate titer	Milk plate titer, Quarter samples LF	LR	RF	RR	Brucella isolations, Direct culture	Comp. milk via guinea pigs
7	+ 200	————	+———	————	+———	————	—	+
36	P 200	————	————	————	————	++———	—	+
67[v]	+ 200	————	————	————	————	++++—*	+	+
68	P 200	————	————	————	————	+++——*	+	+
81	+ 200	————	++———	+———	+———	————	—	+
96	+ 200	————	————	————	————	————	—	+
162	P 200	————	————	————	————	————	—	+
101	P 200	+———	————	++++—*	————	————	+	N. C.
143	+ 100	+———	————	————	————	++++—*	+	N. C.
157	+ 200	+———	————	+———	+———	————	—	+
8	P 800	++———	++———	++———	++———	++++—	—	+
24	P 200	++———	++———	+++++*	+++———	++———	+	+
95	P 400	++———	+++———	————	+++——*	+++———	+	+
180[v]	+ 200	++———	++++—*	++++—*	++++—	++++—	+	N. C.
185	+ 200	++———	+++———	++———	+++——*	+++++	+	N. C.
189	P 800	++———	+++———	+++——*	++———	++———	+	N. C.

V=Marked as calf vaccination on blood test chart; P=partial agglutination; N. C.=guinea pigs inoculated but not cultured.

*The quarter from which Brucella organisms were isolated by direct culture.

ative group on which Brucella isolations were positive. Of the 6 animals in the whey test suspicious group, 3 had serum titers above 1:200. The results of the milk plate test on quarter milk samples are included to show variations in titer between quarter samples. Direct isolations from quarter samples were successful on only quarter milk samples with 3+ or higher milk plate test reactions.

There were a number of instances of marked variation of quarter milk plate titers or of fairly high serum titers with negative or low whey plate titers in which the Brucella isolation studies on the milk were negative. The agglutination test results on these animals are shown (table 5).

DISCUSSION

Of the total of 204 reactor animals involved in this study, 53 (26%) were classified as negative to the whey plate test (table 3). Brucella was isolated from the milk of 10 (18.8%) of the 53 reactors. This degree of error would seem to make the whey plate test unsuitable as an official diagnostic test for brucellosis under the conditions present in Minnesota.

Marked variations were found between quarter milk titers, as well as marked variations in the relative levels of agglutinins in the blood, as compared with the milk (tables 1, 4, 5). These variations suggest that specific Brucella agglutinins in the milk result primarily from udder infection and not from agglutinins in the blood and, further, that there is a barrier to the free movement of agglutinins from one to the other. If this is true, then a critical evaluation of the whey plate test as an official diagnostic test should include culture studies of a number of tissues of the animal in addition to the milk.

These preliminary studies were only on animals with reactor titers to the blood test. Additional studies are underway

TABLE 5—Brucella Agglutination Test Results on Selected Reactor Animals on Which Brucella Isolation Studies Were Negative

Animal No.	Serum titer	Whey plate titer	Milk plate titer on quarter samples LF	LR	RF	RR
1	+ 400	————	————	————	+———	++++—
54	+ 100	————	————	————	————	+++++
125[v]	+ 100	————	————	————	————	++++—
111	P 200	++———	+++++	++++—	+———	+———
168	+ 200	++———	+++++	————	————	————
60	P 800	————	+———	++———	+———	++———
83[v]	P 800	+———	++———	++———	++———	++———
126	P 800	+———	++———	+++———	+++———	+++———
190	P 1600	————	+———	++———	+———	++———
209	+ 3200	————	————	————	————	————

V=Marked as calf vaccination on blood test chart. (The field sero-agglutination titer recorded for these animals was +1:200.)

which involve whey plate tests on all producing animals in reactor herds as well as ring test-suspicious herds classified as negative or suspicious herds on the basis of the blood test results, to determine the frequency or incidence of negative serum titers with positive whey plate test titers in such herds. Bacteriological studies of both milk and tissues are being made on as many animals as possible in those instances in which the results of the two tests are not in agreement.

SUMMARY

1) Blood and milk samples were obtained from 204 brucellosis reactor animals for the purpose of comparing a whey plate test with the standard sero-agglutination tests.

2) Cream and sediment from 112 of these animals were studied bacteriologically by direct culture, by guinea pig inoculation, or by both methods.

3) Brucella isolations were made from 18.8 per cent (10 of 53) of the reactor animals which were classified as negative to the whey plate test. This degree of error would seem to make the whey plate test unsuitable as an official diagnostic test for brucellosis under the conditions present in Minnesota.

4) Marked variations were found between quarter milk titers as well as marked variations in the relative levels of agglutinins in the blood as compared with the milk.

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Veterinarians Tested for Zoonoses.—Blood samples for four serological tests were recently taken from 130 eastern Iowa veterinarians. Nearly half (49.2%) showed titers of 1:40 to 1:640 for brucellosis (32.3% were 1:40 or 1:80); 11 (8.5%) showed titers up to 1:64 for Q fever; 3 showed a titer of 1:4 for psittacosis, but none reacted to leptospirosis.—*R. A. Tjalma, University of Iowa, College of Medicine.*

Reports on Zoonoses

Rabies.—A man developed rabies and died in four days, in California, nine months after he was bitten by the family dog. The dog appeared to be healthy but, two weeks later, bit the son, then disappeared. A stray dog died of rabies in the vicinity three months later. There was no other history of exposure.—*April 27 and May 4, 1957.*

• • •

A child, 10 years old, was bitten on the cheek and forearm by the family dog on April 23, in South Carolina, and was immediately given antirabies treatment. However, following the fourteenth injection, he showed evidence of rabies and died on May 9.—*June 1, 1957.*

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Brucellosis.—A veterinarian in Pennsylvania who was first infected with *Brucella abortus* in 1938, having a titer of 1:1,280 and requiring a year to recover, recently stuck himself in the thumb with the needle while vaccinating calves with Brucella strain 19. He developed a local reaction in the thumb and arm, a tired feeling and stiffness, and a low grade fever for a few days.—*May 18, 1957.*

• • •

Psittacosis.—A veterinarian, an inspector in a poultry-processing plant in Pennsylvania, was one of several employees who became ill about the same time. Of 89 employees tested for psittacosis, 12 reacted with titers above 1:8 (3 at 1:32). The exact source of infection was not established, but chickens, turkeys, ducks, geese, and pigeons were processed. A number of turkeys had been condemned for poor quality several weeks previously.—*May 18, 1957.*

Surgery and Obstetrics
and Problems of Breeding

Demonstration of Specific Nerve Paralyses in the Dog

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IN MAKING an instructional film concerning the functional innervation of the appendages, the Department of Veterinary Anatomy at Washington State College has photographed living animals to portray the paralyses which result from the transection of the major nerves to the legs.

This paper briefly reports the anatomical distribution of each of the major nerves to the appendages of the dog, and the effects of each neurectomy. The effects were not in all cases those which might be predicted from the descriptions of these nerves as given in certain anatomy texts.[1,2]

MATERIALS AND METHODS

Seventy-two neurectomies have been performed in 49 mature dogs of mixed breeding. The nerves were transected singly and in a variety of combinations with other nerves to the appendages. Of the neurectomies performed, 4 were on the suprascapular nerve, 3 on the axillary, 11 on the radial, 7 on the musculocutaneous, 11 on the median, 11 on the ulnar, 5 on the obturator, 5 on the femoral, 6 on the peroneal, 5 on the tibial, and 4 on the sciatic nerve.

All surgery was performed under pentobarbital anesthesia. Great care was exercised to avoid infection and to minimize trauma in exposing the nerves. A ½-inch section was routinely removed from the nerve. Upon termination of the period of observation, which varied from one day to six months, the completeness of each neurectomy was verified at necropsy. Except when the resultant muscle atrophy was to be recorded, the dogs were photographed on the second postoperative day.

Suprascapular Nerve.—Transection of this purely motor nerve which supplies the supraspinatus and infraspinatus muscles produces no visible lameness. It is suggested that action by such muscles as the deep pectoral, the biceps brachii, and the brachiocephalicus compensates for the inactivity of these extensors of the shoulder. The resultant atrophy of the two muscles innervated is made more evident by the prominence of the scapular spine (fig. 1). This atrophy corresponds to the familiar condition of "sweeny" in the horse.

Axillary Nerve.—This mixed nerve includes motor fibers to the teres major, teres minor, and deltoideus muscles. It also has sensory fibers from the lateral aspect of the brachium. Transection results in a small area of cutaneous desensitization on the lateral side of the arm, but there is no pronounced loss of flexion of the shoulder joint. It would appear that, in axillary nerve paralyses, flexion of the shoulder can be acccomplished by the synergistic action of such muscles as the long head of the triceps brachii and the latissimus dorsi.

Radial Nerve.—This functionally important nerve furnishes motor fibers to the extensors of all the joints of the pectoral limb except the shoulder. It is also sensory to most of the dorsal and lateral parts of the forearm and the dorsal aspect of the paw.

Transection at the brachial plexus severely incapacitates the animal. A radial nerve injury at this level may occur in fractures of the first rib.[3,4] Because none of the joints other than the shoulder can be extended, the leg can bear no weight (fig. 2). This is primarily due to the paralysis of the extensors of the elbow; severance of the radial nerve distal to the branches which supply the triceps brachii does not produce the same disability. Since the extensors of the carpus and digits are paralyzed in this more distal injury to the radial nerve, there is some tendency for the dog to knuckle over onto the dorsal side of the paw (fig. 3) when walking. After a few days, the dog learns that a quick flexion of the elbow will flip the carpus and digits into an extended position to properly place the paw. The paralysis is then difficult to detect, but the cutaneous desensitization is diagnostic. Fractures of the humerus are the most common cause of this more distal injury to the radial nerve which courses in the musculospiral groove of this bone.

Musculocutaneous Nerve.—This mixed nerve supplies the biceps brachii and the brachialis muscles and is sensory to the

From the Department of Veterinary Anatomy, College of Veterinary Medicine, State College of Washington, Pullman.

Fig. 1—Left suprascapular nerve paralysis in a dog photographed six months after neurectomy. Notice the prominence of the scapular spine (arrows) due to muscle atrophy.

medial side of the forearm. In addition, a rather large branch joins the median nerve and is distributed with it.

Despite the paralysis of the two large, special flexors of the elbow joint, transection of the musculocutaneous nerve causes little change in gait. When the dog is standing, there appears to be a slight straightening of the elbow. Some difficulty is experienced by the dog in elevating the paw to the edge of the table (fig. 4) but, surprisingly enough, this can be done. One must assume that such muscles as the pronator teres and the extensors of the carpus and digits, which originate on the humerus, are able to flex the elbow joint fairly adequately without the action of the biceps and the brachialis muscles.

Median and Ulnar Nerves.—The median and ulnar nerves together supply all the flexors of the carpus and digits and are sensory to the carpal, metacarpal, and digital pads. The ulnar nerve is also sensory to the skin on the caudal side of the

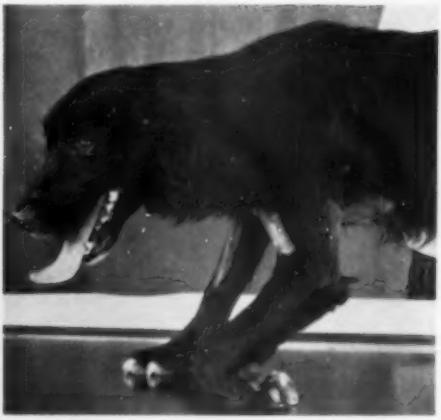

Fig. 2—The entire left radial nerve of this dog is paralyzed. All joints other than the shoulder remain flexed, and the leg can bear no weight.

antebrachium and to the lateral side of the fifth digit.

Transection of these two nerves individually at the brachial plexus produces no lameness and no desensitization of the foot pads. Sectioning of the ulnar nerve does cause desensitization in the areas which are supplied solely by it. Even when both nerves are cut simultaneously, there is little or no alteration of gait and only incomplete sensory loss in the foot pads. However, when the transection includes the

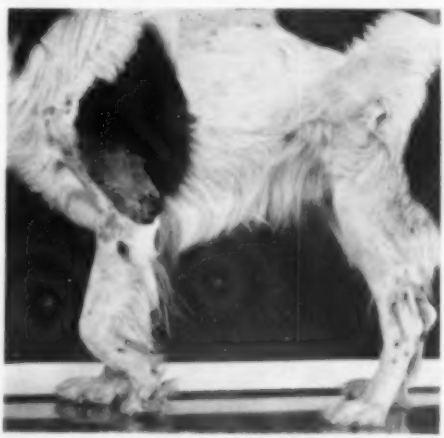

Fig. 3—In this dog, the left radial nerve has been transected distal to the branches which supply the extensors of the elbow; weight can be borne, but there is a tendency to knuckle over onto the dorsal side of the paw.

Fig. 4—Because of left musculocutaneous nerve paralysis, some difficulty is experienced by the dog in elevating the left paw to the edge of the table due to paralysis of the special flexors of the elbow.

Fig. 5—Left median and ulnar nerve paralysis in a dog. No lameness is evident other than a slight sinking of the left carpus and fetlock due to the loss of tone to the flexors of these joints.

branch from the musculocutaneous nerve which joins the median nerve at the elbow joint, the sensory loss is complete. The only indication of muscular paralysis is a slight sinking of the carpus and fetlock when weight is borne (fig. 5); this seems to become more pronounced with time. Flexion of the carpus and digits is apparently partially a passive action. Many of the muscles involved originate on the humerus. Thus, when the elbow joint is flexed in walking, the paralyzed muscles may be mechanically pulled and thus produce flexion of the carpus and digits also. In addition, gravity undoubtedly aids in flexing the carpus when the leg is raised and advanced.

Obturator Nerve.—The obturator nerve innervates the external obturator, pectineus, adductor, and gracilis muscles.

Transection of this purely motor nerve as it crosses the shaft of the ilium results in a marked inability to prevent the pelvic appendage from sliding laterally when the leg bears weight (*see* adv. p. 47). This is apparent only when the dog is on a smooth surface. When both the right and the left nerves are sectioned, the animal literally "does the splits" on such a surface. Inability to prevent abduction of the leg is the only effect of this transection, and this may be unnoticed on a nonskid surface. From this, it would appear that many so-called "postparturent obturator paralyses" may involve injuries to structures other than the obturator nerve.

Femoral Nerve.—The femoral nerve supplies a portion of the iliopsoas muscle and is the sole innervation to the quadriceps femoris muscle. Its saphenous branch is motor to the sartorius muscle and sensory to the medial side of the thigh, stifle, leg, and paw.

Transection of the femoral nerve, as it emerges from the iliopsoas muscle near the femoral ring, results in desensitization in the area supplied by the saphenous nerve, as well as a marked change in gait. Because the quadriceps femoris muscle is paralyzed, the stifle can neither be extended nor fixed to prevent collapse of the leg when bearing weight. The stifle is the key joint of the pelvic appendage, and in a femoral paralysis the hock collapses reciprocally with the stifle. When walking, the animal must take a quick step with the unaffected leg to prevent the complete collapse of the paralyzed leg (fig. 6) while it is bearing weight.

Peroneal or Fibular Nerve.—This termi-

Fig. 6—In left femoral nerve paralysis, the dog's leg collapses when a step is taken because the stifle can neither be extended nor fixed to bear the body weight.

Fig. 7—Peroneal or fibular nerve paralysis of the dog's left leg results in a straightening of the hock and a tendency to knuckle over onto the dorsum of the fetlock and digits.

nal branch of the sciatic nerve supplies the flexors of the hock and the extensors of the digits. It is sensory to the dorsal aspect of the distal part of the true leg, the hock, and the paw.

Transection of the peroneal nerve as it passes superficially across the proximal end of the fibula produces anesthesia in the area mentioned. The motor paralysis results in a straightening of the hock and a tendency for the dog to knuckle over onto the dorsum of the fetlock and digits (fig. 7). Although the hock can not be flexed, the dog soon learns to place the foot properly by a greater flexion of the hip and extension of the stifle joints.

The knuckling at the fetlock is similar to that seen when so-called "downer" cows are first helped to stand. Pressure on the peroneal nerve in its superficial course on the lateral side of the stifle joint may account for this action in animals which have been recumbent for a long period.

Tibial Nerve.—The tibial nerve is the second of the two terminal branches of the sciatic nerve. It is sensory to the plantar side of the hind paw and motor to the extensors of the hock and the flexors of the digits.

Transection of the tibial nerve just before it passes between the two heads of the gastrocnemius muscle results in a loss of sensation to the plantar side of the hind paw. The pronounced change in gait is due to paralysis of the extensors of the hock and flexors of the digits. The hock joint remains flexed when the dog is walking and, when weight is supported on the affected limb, this flexion is accentuated (fig. 8). Irritating intramuscular injections into

Fig. 8—Left tibial nerve paralysis in the dog results in a permanent flexion of the left hock. When the leg bears weight, this flexion is accentuated.

Fig. 9—With left sciatic nerve paralysis, the animal stands "knuckled over" on the dorsal side of the paw while the hock aimlessly and passively flexes and extends as weight is shifted on the appendage.

the caudal thigh muscles may inadvertently affect both the peroneal and the tibial nerves, since these nerves are enveloped by these muscles.

Sciatic Nerve.—The peroneal and tibial nerves which have already been described are the two terminal branches of the sciatic nerve. In addition, this large nerve supplies the massive caudal thigh muscles which extend the hip and flex the stifle joints. Its sensory branches innervate the skin on the caudal and lateral side of the true leg.

Transection of the sciatic nerve as it emerges from the greater sciatic foramen produces complete cutaneous desensitization below the stifle except for the medial side of the leg, hock, and paw. Sensation to this area is supplied by the saphenous branch of the femoral nerve. The gait is markedly altered by paralysis of the muscles to all joints below the stifle; only the extensors of this joint remain functional. The hock of the affected leg aimlessly and passively flexes and extends as weight is shifted on it. The leg does not collapse when bearing weight because the femoral nerve fixes the stifle joint (fig. 9). The animal stands "knuckled over" on the dorsal side of the paw. The hip joint remains functional despite the paralysis of the caudal thigh muscles. The action of this joint is apparently maintained by contraction of muscles innervated by the gluteal, obturator, and femoral nerves.

The course of the sciatic nerve dorsal and caudal to the hip joint makes this nerve vulnerable in such surgical procedures as reduction of coxofemoral luxations and repair of femoral fractures.

SUMMARY

In a study of the functional nerve supply to the limbs, 72 neurectomies were performed in 49 dogs. Photographs illustrate the paralyses which were produced by the nerve transections.

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An Unusual Cause for Lameness.—A mare, bred for the first time when 10 years old, started to favor the right hindleg two weeks after she was bred. In a month, when first seen, she had a swelling from the hock down, and difficulty in controling action of the leg. A nerve injury in the iliac region was suspected, but rectal palpation revealed a scar on the right wall of the vagina with a mass attached to it, which completely filled the right side of the pelvic cavity. It was diagnosed as a retroperitoneal abscess, presumably from perforation of the vagina. When drained with a cannula, through the vagina, a gallon of putrid pus escaped. However, the legs soon became paralyzed and the mare died the next night. On necropsy, the abscess wall was found to be 2 inches thick with the external iliac vessels embedded in it. *Corynebacterium pyogenes* was cultured from the pus.—*V. D. Stauffer in Rocky Mt. Vet. (May, 1957): 8.*

Estrus and Infertility of the Thoroughbred Mare in Australasia*

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MARES IN New South Wales, Australia, and in the North Island of New Zealand are on pasture throughout the year. The season opens on August 1, when the grass, mainly lucerne, is lush. Breeding starts on September 1 and continues until December 15 (summer). After Easter, the pregnant mares are segregated and later brought to smaller paddocks to foal. Dystocia is rare. The mares are run in bands and, since little handling is required, a "crush" or chute is an essential feature of all yards.

At Alton Lodge (New Zealand), 3 stallions and about 150 mares were maintained on 250 acres. Over 100 were brought for breeding, arriving from July onward and leaving in December.

The findings here reported on the estrous cycle are from mares visiting 2 stallions of known high fertility which, during 1947 and 1948, were bred to 222 mares (125 and 97) with 178 conceptions (80.2%). Of these mares, 4 died, 8 aborted, 5 had dead foals, and 2 lost twins, resulting in 159 live foals (71.6%). The average services per conception were 1.8 and 1.6, respectively.

The concensus of most authorities has been that maiden mares have the highest breeding efficiency, followed by barren mares, and that mares with foals have the lowest efficiency (87.67%, 82.4%, and 77.89%, respectively).[8]

An attempt will be made to demonstrate that variations in the display of estrus can be correlated with changes in ovarian activity.

PHYSIOLOGY OF ESTRUS

The usual conception of estrus is that estrogen in a maturing follicle triggers the chain of events resulting in mating and that ovulation, normally occurring in the last 48 hours, results in the formation of a corpus luteum whose hormone terminates the display of estrus.

There are, however, many exceptions. In the prolonged spring estrus of barren mares, the ovaries are often apparently inactive and there are no accompanying changes in the cervix and vagina. Estrus can occur with inadequate follicular development.[25] Maturation of the follicle can also occur after the onset, and several mares were found displaying estrus without follicular development.

The relaxation of the cervix, accompanied by a mucoid secretion, is the main indication of a normal estrus. It usually increases during estrus but often is complete at the onset. Proestrus and metestrus are better recognized by the intensity of the display of estrus than by vaginal examination.

CHANGES IN ANIMAL BEHAVIOR DURING ESTRUS

The estrous cycle of the higher animals is characterized by periods of male receptivity and maximal conditions for fertilization and inplantation of the ovum. During these periods, the presence of the male will evoke in the female a specific reaction.

Teasing or trying of mares for evidence of heat is the most important job on a stud farm. Ponies were found to make the best teasers and were more tractable; 1 which had been vasectomized was especially successful. Teasing every other day is essential and, if not done for 21 days after service, some mares will have been in and out of heat within that time.

Foaling mares are best teased in a chute 12 ft. long and 3 ft. wide with the far wall made solid to a height of 4 ft. 6 in. and a single rail at 5 ft. 10 in. The teasing is done over a single rail at a height of 3 ft. 7 in. with a restraining rail at 5 ft. 10 in., instead of over a solid gate as is often done in the United States.

Two teasers are always used, 1 at the crush and 1 in a pen beside the holding yard, where the mares can see and approach him. Many mares display to the teaser in the pen before or after being in the chute, although they show no response in the latter. The foal is placed in the chute ahead of the mare to reduce the masking influence of maternal instinct.

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*Excerpts from the paper presented before the combined sections on General Practice and Surgery and Obstetrics, Ninety-Third Annual Meeting, American Veterinary Medical Association, San Antonio, Texas, Oct. 15-18, 1956.

Barren mares are teased with the pony on the end of a long lead without being driven into yards. They quickly become used to this method and most come up voluntarily. This does not apply to shy mares; after 21 days, mares which have displayed no signs of estrus are segregated and teased individually in a chute. In the wild state, where the stallion is not a stranger, there are no shy mares. When turned out with the stallion, 87.5 per cent of barren or shy mares conceived.[29] To keep the ponies vigorous and keen, they should be allowed to breed an occasional mare.

When running loose, a jealous mare not in estrus, will often try to prevent a meeting between the mare in estrus and the pony. Mares usually pair off and this is most noticeable when 1 of a pair is involved.

The psychology of estrus is under the control of two major factors: (1) the external provoking influence provided by the male or trying animal; (2) the internal endocrinal activity, still imperfectly understood.

In the wild state, the external influence is constant but, in domesticity, it is influenced by restraint,[2] by the strangeness of the trying animal, or by the foal. One unbroken mare, whose periods of estrus could only be detected by vaginal examination with a speculum, did not conceive one season but behaved quite normally the next. Color is also a factor; a band of bay, brown, and chestnut mares commonly have an active dislike for any gray teaser.

The frequency of teasing, *i.e.*, every other day, is important not only in combating the irregularities of the cycle but also in familiarizing the mares with this procedure.

The normal mare will often herald her proestrus with a slight show of interest in the teaser. Similarly, at the approach of metestrus, there are signs of diminished interest. Mares with foals at their sides often evince estrus only by the lessening of a very active intolerance to the trying animal; when twitched, they will often "show." However, only 1 mare not in estrus has been seen which would allow the pony to mount without much objection, and she was pregnant.

Speculum examination may be necessary to verify estrus. Two barren mares, which would give no display until teased in a chute, subsequently would display only when teased in the chute. Some mares show a slight increase in the intensity of the display, culminating with ovulation; however, the marked differences previously described[2] have not been observed. In barren mares, a prolonged spring estrus is often of a lower intensity and ovarian activity is low, but occasionally a normal estrus with maturation of a follicle occurs at the end and is heralded by a much greater intensity in the display. Similarly, in a normal estrus, a second follicle can mature just after the first has ovulated, or regressed, and will be reflected by a pronounced increase in display.

It has been reported[2] that, in mares with foals, the display is better at the foaling heat than later but this has not been the author's experience. Mares in which the display of estrus is easily recognized may change, the reduction in display being of any grade to silent heat.

Of the mares in which estrus was difficult to recognize, 24 had endometritis, either then or previously (6 due, primarily, to "wind-sucking" into the vagina), 7 had cystic ovaries, 6 had small fibrous ovaries, and in 7 the main cause of this condition could not be ascertained. With one exception, no pregnancies ensued until the mares returned to their normal display of estrus, even when ovulation occurred naturally or was induced.

The function of the endometrium of the pregnant animal, *i.e.*, the production of gonadotrophin, has been demonstrated.[30,31,32] It may also play a part in the production of normal estrus.

True silent heat, with no signs of estrus, is rare under Australasian conditions, probably because the mares are run in bands. Silent heat is invariably found in maiden, unbroken mares, or mares with foals at their sides, indicating that the condition is due to the interference of an external factor. It is extremely difficult to differentiate between the shy mare and one with silent heat. A typical case was a plegmatic maiden mare which, by frequent speculum examination, was found in estrus on two occasions, yet she would allow the pony to mount at any time. She became pregnant and behaved more normally the next season. If mares with silent heat have been barren, a latent endometritis or ovarian dysfunction should be suspected.

False display of estrus is, in most cases, a nervous reaction and of short duration. It invariably occurs in pregnant mares, often after a journey. One mare, 20 days pregnant, accepted the male.

The mare with a so-called "cystic ovary complex" reacts to the teaser by straddling and frequent micturitions. She is nervous, the urine is watery instead of viscous, and there is much tail swishing. These mares show properly when in estrus but display as mentioned at all other times, including pregnancy. This syndrome is said to occur also in mares with true cases of cystic ovaries.[33] A false display also occurs after treatment with stilbestrol, due to reflex vaginal irritation from the hyperemia.[27] It occurs one or two days after doses of 20 to 30 mg., or more, and lasts for two to three days. A false display often occurs during an acute exacerbation of an endometritis.

Case Report.—One mare foaled on Oct. 4, 1948, and the fetal membranes had to be removed manually. She was in estrus from October 12 to 17 and appeared normal but was not bred. She showed estrus again from October 26 to 30 and was bred. On November 5, pus was noticed at the vulva and, on speculum examination, the cervix was large, flaccid, moist, and congested. Hemolytic Streptococcus was isolated. She was given 25 mg. of stilbestrol and an intrauterine capsule of penicillin cerate (25,000 units) every 12 hours.

On November 8, her display closely simulated estrus but was not as intense and she would not allow the teaser to mount. There was follicular de-

velopment in the right ovary. In four days, when the display ceased, there was no sign of infection and the cervix was partly constricted. The false estrus was probably due partly to the presence of pus and partly to the stilbestrol, but the psychological reaction and duration were different from that seen after treatment with this drug where no infection is present.

This case is noteworthy because the pregnancy continued through an acute endometritis, and the mare foaled normally in October, 1949.*

The duration of 201 estrus periods in mares during 1947 and 1948 (table 1) was two to 16 days (av. 6.4), resembling the six-day[16] and seven-day[17] periods reported for Thoroughbreds. Fertility is not related to the duration of the cycle; the average duration for fertile cycles was 6.5 days. Estrus periods of only 24 hours' duration have been reported,[18,2] but were not seen.

TABLE 1—Duration of Estrus (Other than Foaling Heat, and Fertility Rate

Days (duration)	Periods* (No.)	Pregnant (No.)	Fertilities (%)
2	3	---	0
3	7	5	70
4	33	19	58
5	43	23	53
6	32	18	56
7	29	17	59
8	13	7	54
9	19	11	58
10	8	5	63
11	6	3	50
12	3	1	33
13	2	2	100
14	2	---	0
15	---	---	---
16	1	1	100

*Number of estrous periods (regardless of the number of mares) which lasted for the number of days shown in column 1.

DIAGNOSIS OF ESTRUS

Except in the prolonged spring estrus of barren mares, no true estrus was found without the typical relaxation and enlargement of the cervix. Speculum examination is, therefore, the only reliable means of determining estrus.

On rectal examination, estrus may be suspected if a follicle is presented and the uterus is found slightly enlarged and flaccid. The turgidity of the uterus found in cows is, in mares, a sign of pregnancy, not of estrus. Large follicles can and do occur without estrus.

SURVIVAL OF SPERMATOZOA IN THE FEMALE GENITIAL TRACT

Since ovulation in the mare occurs in the last 48 hours of estrus, it has been assumed that this is the most fertile time; however, this was not found to be true. The survival time of spermatozoa in the female genital tract is considered to be five to six days.

As an indication of sperm survival time, pregnancy results in 286 estrus periods of varying length (86 postparturient and 200 normal) are shown (table 2). Ovulation occurred most frequently within 24 hours of the end of estrus and 90 per cent were within the last 48 hours.

Sperm survival was studied, using artificial insemination, with ovulation detected by frequent rectal examinations. Fertilities had been reported 72 hours prior to ovulation,[14] and as being fairly high up to six days prior to ovulation.[17] Mating at the beginning of estrus with 615 mares and a large number of stallions of varying fertility had achieved 80 per cent pregnancies.[6] This early meeting was used at Alton Lodge. The 2 stallions used there were both in the upper normal level of fertility. Only when giving difficulty, or at the end of the season, were mares bred twice or luteinizing hormone used in an attempt to approximate service and ovulation. How seldom this was required is shown by the service figures—in two seasons, the 2 stallions served 222 mares and 80 per cent became pregnant, an average of 1.7 services per mare.

Investigators have recommended that the interval between services should not be longer than three days,[17,14,4] but one[4] reported a successful service at 126 to 138 hours prior to ovulation. Apparently, with a fertile stallion, services can be spaced at five-day intervals and, even with a stallion of lower fertility, mares should be bred at the beginning of estrus and rebred only if the period is long. Following parturition, estrus in the mare shows more variations than in any other animal, yet it is taken for granted that it will occur on the ninth or tenth day. At least 20 per cent are exceptions.[8,12,13,2] It is also erroneously considered to be the most fertile estrus in the mare but actually it shows more irregularities than any estrus.

The first signs of estrus in mares have been reported at 2 to 100 days after foaling;[2] however, with Thoroughbreds there might be less variation. Since mares were segregated until the foals were 7 days old, the display had to be observed in the paddock. Observations on the onset of 124

*The foal, named Dalray, become well known as a racing horse.

TABLE 2—Interval in Days Between Mating and End of Estrus

Days (duration)	Periods (No.)	Pregnant (No.)	Fertilities (%)
0	6	3	50
1	18	11	61
2	27	14	52
3	67	39	58
4	63	38	60
5	41	26	63
6	19	12	63
7	14	7	50
8	18	10	56
9	8	4	50
10	1	0	----
11	1	0	----
12	1	0	----
13	2	0	----

TABLE 3—Conception Rate of Mares with Late Foaling Estrus

Mare	Day after foaling estrus observed	Day served	Duration of estrus (days)	Results
1	14	Not served	6	----
2	14	16	15	Barren
3	16	16	4	Pregnant
4	17	17	9	Aborted
5	21	23 and 25	8	Barren
6	23	28	9	Pregnant
7	23	24 and 27	8	Pregnant
8	26	27	5	Barren
9	27	27	4	Pregnant
10	27	Not served	4	----
11	32	32	6	Pregnant

foaling heat periods indicated that 26 per cent of the mares were in estrus by day 8, 56 per cent by day 9, and 79 per cent by day 10. All mares commencing earlier than day 9 were still in estrus on the ninth day. Eleven mares (8%) did not show any signs of estrus until day 14 or later (table 3).

A summary of the duration of 102 foaling heat periods during the 1947 and 1948 seasons is shown (table 4). The average duration was 5.6 days and the fertility rate 54 per cent, compared with 6.5 days and 56 per cent for other than foaling heat. When 31 other foaling periods observed are included, the average duration falls to five days.

A comparison of tables 1 and 4 shows a larger number of foaling estrous periods of short duration (13% were 2 or 3 days) and of low fertility, suggesting some abnormality. Many of these mares displayed a low degree of estrus, termed a "subestrus" and, on rectal examination of 17 such mares, no follicles of 1.5 cm. or larger were palpated. However, the over-all conception rate during the foaling heat periods was comparable to other periods.

PROLONGED SPRING ESTRUS OF BARREN MARES

Estrous periods reported in barren mares in the spring have been as long as 37,[2] 60,[14] and 83 days.[6,7] It was observed that periods became shorter as the season advanced.[17]

Extraneous factors considered to influence reproduction include light, temperature, and environment.[1] The latter could include nutrition. In the winter, barren mares are either in anestrus or are displaying short periods, the latter being more common. With the advent of spring, most of these mares go into prolonged estrus which is only terminated when they shed their coats. This estrus is apparently initiated by the external factors of light and temperature, it continues longest in maiden mares in poor condition. In New Zealand, mares which were blanketed and fed concentrates did not develop this prolonged spring estrus, but it occurred in 71 of 97 uncared-for barren mares.

In Australia, the duration of this estrus was eight to 48 days (av. 24) and of low intensity, followed by a diestrous of one to 33 days (av. 12), and then a normal estrus of four to 14 days (1 was 22 days; av. 8.3 days). Of 14 mares bred at the first normal estrus, 12 conceived. In 1 mare, the 39-day estrus was followed by a diestrous period of one day and a greatly intensified estrus of six days. During this prolonged estrus, the ovaries were usually small and inactive; however, follicular development and ovulation did occur. The condition of the cervix and vagina varied from that typically found in "deep anestrus" with a dry, pale vagina and a tightly constricted cervix, to the more common "diestrous-like" condition with both the cervix and vagina slightly injected. When follicles developed until they were palpable, relaxation of the cervix occurred. Some services were

TABLE 4—Duration of Foaling Heat Periods and Fertility Rate

Days	Periods (No.)	Pregnant (No.)	Fertilities (%)
2	7	2	28
3	11	2	18
4	21	12	57
5	23	16	79
6	9	3	33
7	11	7	64
8	7	4	57
9	5	4	80
10	4	3	75
11	2	0	0
13	2	1	50

fertile at these times but service is not recommended because of the risk of infection due to the relative avascularity of the genitalia. This is not a false estrus, as the mares will accept service, but the condition of the ovaries suggests an extraovarian source of estrogens. Two mares continued to display for 12 to 14 days without further follicular development or relaxation of the cervix.

One mare was in estrus 4 days, in diestrus 13 days, in estrus 3 days, again in diestrus 2 days, and finally in estrus 45 days. She showed an increased intensity of heat on the last day, was served, and became pregnant. Another mare was in estrus 7 days, in diestrus 11 days, in estrus 11 days, in diestrus 3 days, and again in estrus 25 days. Three mares experienced two consecutive prolonged spring estrous periods before shedding their coats.

IRREGULARITIES OF ESTRUS

The main irregularities in estrus are not in duration but in (1) intensity of display, (2) lack of follicular development, and (3) lack of ovulation. Lack of intensity of display was taken as evidence of some pathological interference, so the uterus was irrigated with 14 oz. of double strength normal saline solution at about 100 F. Of 14 mares so treated, 9 displayed a normal estrus in one to seven days, and 5 conceived; 1 mare became pregnant at the following estrus.

Lack of follicular development occurred in 12 mares. Follicle-stimulating hormone (FSH, 1,500 I.U.) had no effect. However, the reflex stimulation of uterine irrigations resulted in ovarian response in 6, but in pregnancies in only 2, of the 12 mares.

Lack of ovulation is difficult to determine since the resulting corpus luteum is hard to detect when over 48 hours old. Of 164 mares on which luteinizing hormone (1,500 I.U.) was used, 65 per cent conceived. In 15 per cent, no cause of failure was apparent. Lack of implantation of the fertilized ovum is considered more of a factor than lack of ovulation.

ANESTRUS

This occurs in maiden mares out of training and in some barren mares at the beginning of the season; also in mares with genital infections or endometritis, or with cystic or fibrous ovaries. In many mares, the cause remains obscure. It occurs more commonly in mares without foals.

After using stilbestrol (25 to 30 mg.), about 60 per cent of the mares were in estrus within ten days and 35 per cent conceived. About 85 per cent of 148 mares given uterine irrigations were in heat in two to 12 days and 56 per cent conceived at first service. A few mares with foals showed no response, presumably due to the prolactin or to the luteinizing hormone of the pituitary gland. Refractory cases with no obvious ovarian abnormality were treated with antibiotics and stilbestrol implants (45 to 75 mg.). This often invoked a male reaction but did not affect fertility or the reactions to the stallion when the mare was in estrus.

ABORTION

Abortions and early embryonic mortalities are difficult to differentiate when mares are in large fields. In Australia, these seem to pose a serious problem (table 5); of 1,622 mares found to be pregnant during 1950 to 1955, 235 (14.5%) failed to produce foals; 93 (5.7%) were known to have aborted, leaving 142 (8.8%) uncertain. In other areas of Australia, the abortion rate is reported at about 10 per cent.[24,23] In two years at Alton Lodge, the rate was 5 per cent. The incidence of abortion was found to be low in America.

Pregnancy was ascertained only by manual examination and, of over 1,500 mares examined in Australia, no nonpreg-

TABLE 5—Incidence of Abortion in Mares in Australia

Mares	No. found pregnant on test	Early abortions* (No.)	Early abortions* (%)	Late abortions	Total abortions (No.)	Total abortions (%)
Foaling	918	121	13.2	11	132	15.1
Dry	544	69	12.7	14	83	15.1
Maiden	160	16	10.0	4	20	12.5
	1,622	206	12.7	29	235	14.5

*Fetuses under 6 months old or date of abortion not recorded.

nancy finding was in error. The examinations should be made after 30 days and repeated if there is any uncertainty. The manual test for pregnancy is accurate and not a factor in the cause of abortion.[15] Biological examination of the serum is considered an efficient test only after 45 days of pregnancy.[9] The efficacy of any pregnancy test which indicates a high rate of later abortions should be questioned.

A total of 208 mares aborted, and 37 aborted more than once, 20 of them in successive years. In late abortion and in abortion at term, infection of the fetus plays a large part, *Streptococcus zooepidemicus* often being incriminated but never *Salmonella abortivoequina*.

Embryonic mortality, a considerable factor in bovine infertility,[5] is also a factor in horses in Australia. The causes are probably temporary since 60 per cent produce a live foal in the following season and a few in the same season. In only 18 per cent, was a pregnancy not recorded within the next two years.

There is divergence of opinion about the presence and source of progestogens in the mare.[11] Progesterone implantation has been tried, giving the first implant when the mare is 36 to 50 days pregnant. At first, 100-mg. tablets were used; later 200 mg. was given and repeated in two months. Results have been disappointing. Abortion subsequently occurred in 8 mares given 100-mg. tablets, in 7 given 200 mg., and in 1 given 300 mg. One mare, pregnant at 35 days, was given 200 mg. of progesterone. A week later, she was in estrus and served. Again, when 39 days pregnant, she was given 200 mg. of progesterone and was later found to have aborted. Since the rate of abortion is uniformly high, there may be some environmental factor. What the effects of mineral imbalance are is not known.[21,22]

INFECTIONS AND OVARIAN ABNORMALITIES

Endometritis, resulting from aspiration of air into the vagina, responds rapidly and successfully to surgery.[6] The bacterial flora is similar to that in America except that *S. abortivoequina* has not been encountered.[16] *Str. zooepidemicus, Klebsiella pneumoniae, Escherichia coli*, and *Pseudomonas aeruginosa* are the most commonly found organisms but a variety of Shigella, Corynebacterium, Paracolon, and Aerobacter occur, probably as contaminants.

What part retention of the fetal membrane plays in the genesis of endometritis is difficult to estimate. The membranes are often not examined and retention is frequently treated by the groom. Of 152 mares at Alton Lodge, 4 per cent retained the nonpregnant horn of the placenta and 6 per cent retained the entire membrane.

Treatments, often unsuccessful, include intrauterine antibiotics and implantation with stilbestrol.

Endometritis and vaginal catarrh also occur in cases of ovarian abnormality. Vaginal catarrh may be a sign of low estrogenic levels. True cystic ovaries are rare but fibrous cystic degeneration is common. The latter are successfully treated with stilbestrol implants (75 mg.). Mares with cystic ovaries, and continuously in estrus, have never been encountered. Mares with small fibrous inactive ovaries have proved the most recalcitrant to treatment; any recoveries appeared to be spontaneous.

CONCLUSION

The manifestations of estrus in the mare in Australasia are described. The prolonged spring estrus of barren mares is treated as a separate physiological entity. The onset of postparturient estrus was found to vary; only 56 per cent starting by the ninth day. The fertility at this estrus compared favorably to that of other heat periods.

The length of sperm survival in the female genital tract is postulated at five to six days. An inappropriate time of mating, as a factor in infertility, is doubted.

Anestrus and early abortion (which is high, 12%), are both important causes of infertility in Australia. Anestrus was especially recalcitrant to treatment in mares with foals. The cause of early abortion is not known.

Some extraovarian source of estrogens is suggested since estrus can occur with inadequate follicular development and since the prolonged spring estrus in barren mares occurs without corresponding cervical and vaginal changes. In many cases, endometritis apparently suppresses estrus.

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Postoperative Tetanus in Man.—During a week in which there were 131 operations, in an operating room in Britain, 5 cases of tetanus followed, and 2 patients died. Tetanus spores were found in samples of dust and wall plaster and on the surgeon's gloves but none on the suture material. The organisms conceivably could have come from infected animal hair used in binding the ceiling plaster.—*J.Am.M.A. (June 29, 1957): 1006.*

Heredity of Roaring in Horses.—When the progeny of 9 stallions, 7 of which were roarers and 2 of which were sound but came from roaring parents, were compared with progeny from 14 sound stallions all bred with similarly classified mares, 10.7 per cent of the former but only 4.8 per cent of the latter became whistlers or roarers. The incidence of roaring was not increased in the progeny that were affected with strangles.—*J. Quinlan and D. D. Morton in J. South Afric. V.M.A. (March, 1957): 63.*

Virus Abortion in Sheep.—When 60 abortions occurred in a flock of 300 sheep, in France, there was evidence of no infective agent except a virus. Evidence of the virus was found in the uterine exudate at the time of abortion and for four to six weeks afterward. It was found only in secretions colored by hemoglobin.—*Bull. Acad. vét. France (Oct., 1956): 398.*

Fat Embolism.—Fat embolism occurs in almost all serious cases of accidental trauma and is believed to be a major factor in 10 to 20 per cent of the deaths in man from trauma. Restlessness, dyspnea, pallor, sweating and, later, cyanosis may appear from a few hours to several days after the trauma. If the patient survives the pulmonary insult, irritability, delirium, and coma frequently follow. Ophthalmoscopic examination may reveal fat globules in retinal arteries. Oxygen therapy and supportive care are indicated.—*Minnesota Med. (Dec., 1956): 775.*

Surgical Correction of a Congenital Mammary Abnormality in a Heifer

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A GRADE Jersey heifer calved at about 21 months of age. Prior to calving, nothing unusual had been noticed in the size of the udder, quarters, or teats; however, at the first milking, an abnormality was found.

Examination revealed that the right hind teat was slightly smaller and the right hindquarter was slightly larger and more turgid than the others. A small fistula which was discharging milk was situated halfway down the right hind teat at the posterior aspect. No milk could be drawn from the normal teat opening, not even when a teat catheter was inserted 3 inches into the streak canal. Operative treatment was adopted, the plan being to close the fistula and restore normal function by allowing the milk to flow into the gland and test cisterns.[1]

PROCEDURE

The heifer was kept without feed and water for 15 hours. After being cast on her left side, the fore- and hindlegs were drawn up and secured anteriorly and posteriorly, respectively. A straw-stuffed sack was adjusted under the cranial end of the neck to allow saliva to escape by gravitation.

Anesthesia was effected with chloral hydrate (60 Gm. in 480 ml. of 25% dextrose sol.) and slowly infused into the mammary (subcutaneous abdominal) vein, using a gravity drip tube bearing a T-piece and tap. When deep analgesia was reached, the chloral solution was stopped and, to maintain intravenous access, a solution containing 10.0 per cent dextrose and 0.9 per cent NaCl was run in via the distal part of the same tube. This change-over was accomplished by using the T-piece. The dextrose-saline solution was made up in a liter bottle and allowed to drip very slowly. Whenever deeper anesthesia was needed, an assistant was asked to switch the tap of the T-piece back to the chloral flow. By this means, anesthesia could be maintained by an untrained assistant under the direction of the operator.

The right forequarter of the udder was stripped to more effectively outline the affected quarter. The operative site and the surrounding parts were carefully brushed, rinsed, washed with a bacteriostatic soap, and finally wiped thoroughly with benzalkonium chloride. The area was draped; 2 oz. of a solution consisting of 5 ml. of adrenalin sulfate 1:1,000, 1 million LU. of penicillin G, and 450 ml. of distilled water was infused into both the fistula and the normal opening of the teat. For two minutes this solution was allowed to exert what capillary contraction it would via the intact mucosa. Then, the teat catheter was passed into and left in the normal opening of the teat.

The fistula was enlarged by a longitudinal incision, about ¾ inch distally and about 2 inches proximally. Milk gushed out and most of the turgid area immediately became flaccid. However, the teat catheter was not exposed due to a septum (fig. 2, S_1) which divided the teat cistern; the anterior section of the quarter was still turgid. This septum was then excised as far as possible, and the catheter became visible. The bleeding points were secured with artery forceps.

At the level of the gland cistern, another septum (fig. 2, S_2) that was restraining milk in the anterior portion of the affected quarter was palpated digitally and grasped at four points with tissue forceps. A window was then cut in this septum, whereupon the remaining portion of the quarter became flaccid as the milk poured out. Bleeding points were secured and twisted off.

The wound was closed with interrupted quill vertical mattress sutures placed ⅛ inch apart, using 000 nylon, being careful to avoid including the mucosa (fig. 1). When all the sutures were inserted, cotton wool rolls with a diameter of about 3/16 inch were placed between the skin and the sutures. The sutures were drawn tight and

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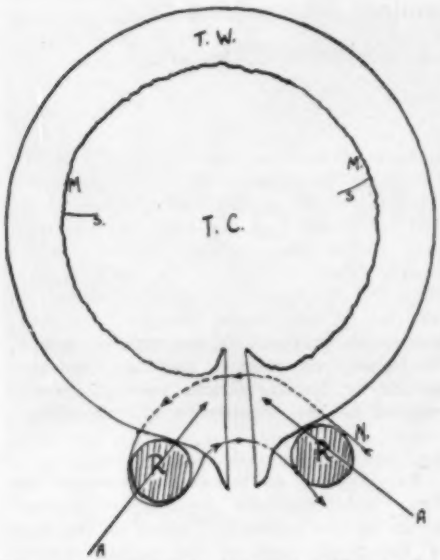

Fig. 1—A diagrammatic transverse section of the teat of a heifer showing the teat wall (T.W.); teat cistern (T.C.); cotton rolls (R); positions where digital pressure was applied (A,A); nylon (N); and the stump of the septum (S).

tied after pressure had been brought to bear at points A and A (fig. 1) to insure that no part of the mucosa of the teat on one side of the wound apposed the mucosa on the other side of the wound. The wound was protected with collodion.

When suturing was complete, the cut edges of the septums were forced apart by injecting more of the adrenalin and penicillin solution via the streak canal. A few hours later, sulfanilamide in oil was instilled into the gland via a teat catheter to prevent adhesions forming between the cut edges. Administration of the oil was repeated at twice daily intervals, after increasing amounts of milk had been allowed to run away via a catheter. Prophylactic doses of 100,000 I.U. of intramammary penicillin were used at 48-hour intervals. Ten days later, the milk was clear and the sutures were removed.

A small fistula, which will be attended to when the animal is dry, still remained in the teat. Apart from this, the object of the operation appeared to have been attained, and the quarter saved from pressure atrophy by immediate examination and surgery.

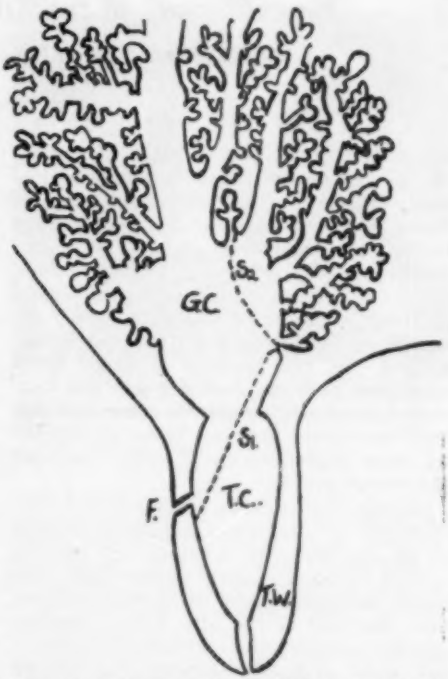

Fig. 2—A diagrammatic longitudinal section of the affected gland of a heifer showing the gland cistern (G.C.); teat cistern (T.C.); fistula (F); teat wall (T.W.); and septums in teat (S_1) and gland (S_2) cisterns.

SUMMARY

1) The surgical correction of a congenital abnormality in one quarter of a bovine udder is described.

2) Two septums, one separating the teat from the gland and one obstructing the anterior portion of the gland, were removed, allowing the quarter to be milked.

3) Mastotomy is suggested as a procedure of possible use to practicing colleagues who may not have used this method of udder surgery.

Fertility of Frozen, Stored Semen.—Semen samples from 5 bulls were divided and one part was used fresh; the other part was frozen at −79 C. and stored. The mean fertility of the fresh semen was 68 per cent. That of the frozen samples was 66.7 per cent after 14 days' storage, 70.1 per cent after six months' storage, and 65.7 per cent after 12 months' storage. —*J. Dai. Sci. (May, 1957): 537.*

Intracranial Nerve Root Tumors—Report of a Neoplasm (Neurofibroma) of the Trigeminal Nerve in a Dog

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PRIMARY TUMORS of the roots of cranial nerves are seldom found in domestic animals. One list of 24 intracranial tumors found in dogs included only one nerve tumor, a hamartoma of the gasserian (semilunar) ganglion.[1] A dog in which fibrous enlargements of the intracranial portions of the third and fifth nerves resulted in hydrocephalus has been described.[2] In two reports, of about 1,000 neoplasms each, one included only five that were intracranial,[3] while the other included only four nerve tumors.[4] Three of the latter were neurofibromas but none involved the cranial nerves.

Another list of brain tumors in the dog[5] included a gasserian ganglion glioma which also involved the sixth and seventh cranial nerves and their nuclei; there was also a paralysis caused by an endothelioma near the root of the fifth nerve. Another report included three intracranial tumors but none primarily involved the cranial nerves.[6] Tumors of the roots of cranial nerves are not mentioned in two books on tumors.[7,8]

The most common intracranial nerve tumor in man is the so-called "acoustic neurinoma," a benign neoplasm of Schwann cell origin (neurilemmoma, Schwannoma). In rare instances, it may develop on cranial nerves other than the eighth. Of 41 Schwann cell tumors reported in cattle, sheep, and swine,[9] three were acoustic neurinomas.

CASE REPORT

Progressive atrophy of the muscles of mastication on the right side was observed in a mature, male Doberman Pinscher over a period of several months. Finally the dog began to circle deliberately and continuously in the direction of the atrophied muscles. Sensation was impaired but not absent in the area served by the mandibular division of the right trigeminal nerve.

After euthanasia, the head was perfused with 10 per cent formalin. Dissection revealed severe atrophy of the muscles supplied by the right mandibular nerve. In addition to the large muscles (masseter, temporalis, pterygoids), the mylohyoideus, the tensor veli palatini, and the anterior portion of the digastricus were pale and reduced to the consistency of connective tissue, contrasting sharply with the adjacent unaffected muscle tissue.

Examination of the brain revealed two firm, circumscribed contiguous enlargements of the trigeminal nerve on the floor of the right part of the middle cranial fossa (fig. 1). The proximal mass measured 1.9 cm. by 3.8 cm. The distal one was slightly smaller. The proximal portion, involving only the roots and ganglion of the nerve, was located immediately adjacent to the pons. It produced a deep depression in the right temporal lobe and pontine area (fig. 2), which extended as far forward as the hypothalamus. The midbrain was compressed to the extent that the aqueduct was displaced to the left of the median plane, resulting in great enlargement of the third and lateral ventricles (fig. 2). The distal enlargement involved the entire intracranial portion of the mandibular nerve (fig. 1).

Microscopic examination revealed that the branches of the ophthalmic and maxillary nerves were not seriously affected but those of the mandibular division were degenerate in varying degrees as evidenced by fibrosis, loss of myelin, and axon degeneration. The inferior alveolar nerve was replaced almost entirely by collagen. The lingual nerve, possibly due to accessions from the facial nerve via the chorda tympani, was the least affected of the mandibular branches.

The Tumor.—Although there is some difference of opinion, neoplasms of the peripheral nervous system are generally believed to originate from the cells of the neurilemma.[10,11] They are encapsulated and usually solitary. The nerve fasciculi be-

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Appreciation is expressed for the consultation of Capt. W. M. Silliphant, M.C., U.S.N.; Col. F. E. Council, M.C., U.S. Army; and Lt. Col. T. C. Jones, V.C., Armed Forces Institute of Pathology; also Dr. A. M. Watrach, Department of Veterinary Pathology and Hygiene, College of Veterinary Medicine, University of Illinois.

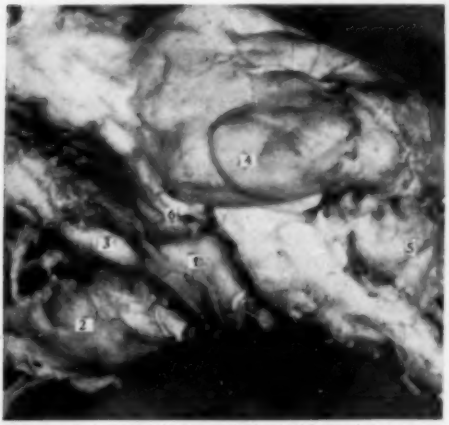

Fig. 1—Left ventral view of dog's brain showing tumor on right trigeminal nerve: (1) proximal mass, (2) distal mass with branches of the mandibular nerve, (3) maxillary branch of right trigeminus, (4) pyriform lobe, (5) cerebellum, and (6) hypophysis.

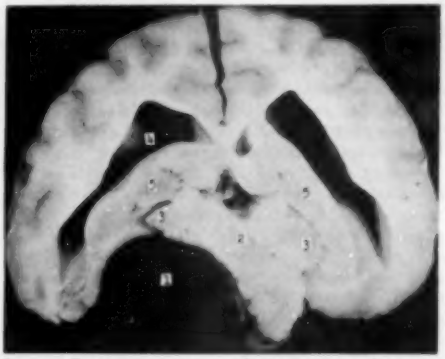

Fig. 2—Transverse section of dog's brain (anterior view) showing distortion produced by tumor: (1) depression produced by tumor; (2) cerebral aqueduct; (3) lateral geniculate bodies; (4) lateral ventricle; and (5) lateral parts of thalamus.

come spread out over the tumor surface. The tumors grow slowly and are usually benign. The Schwann cells are arranged in whorls and their elongate nuclei tend to be aligned in rows (palisading). Often the arrangement is like that of a large tactile corpuscle (Verocay body). Thick collagen sheaths occur around many of the blood vessels. Tumors of this type are called neurilemmomas, Schwannomas, or acoustic neurinomas.

When there is less distinct encapsulation of nerve elements and more diffuse distribution of tumors, the term "neurofibroma" is preferred. These may occur singly, however. Axons tend to occur within the tumor itself, instead of being entirely on the periphery. True palisading and Verocay bodies are usually absent.

A report on tissues submitted to the Armed Forces Institute of Pathology indicated that the tumor in question was of sheath cell origin but of uncertain classification. The absence of Verocay

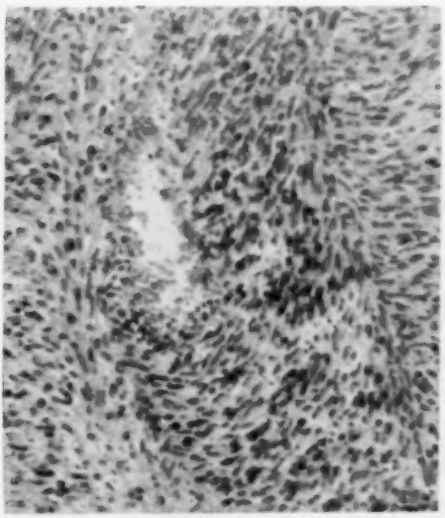

Fig. 3—Photomicrograph of tumor showing arrangement of the essential cells and areas of leukocytic infiltration and hemorrhage. x 100.

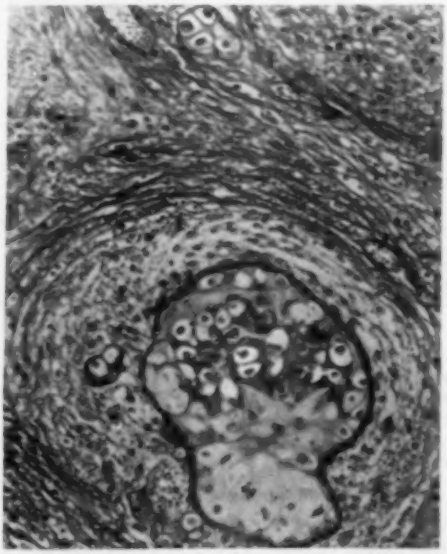

Fig. 4—Photomicrograph of tumor showing islands of calcifying cartilage. x 100.

bodies and unquestionable palisading of nuclei precluded a diagnosis of neurilemmoma. Furthermore, many degenerate nerve fibers were incorporated diffusely within the substance of the tumor. It was concluded that the classification of "neurofibroma" is preferable. Malignant transformation was suggested by cellular anaplasia, necrosis, and fairly numerous mitotic figures.

Among the fibrous and cellular whorls in the proximal mass were islands of metaplastic cartilage, consisting of concentric layers which appeared increasingly differentiated from without inward (fig. 4). Sensory cells of the semilunar ganglion, many of which were degenerated or destroyed, were situated peripherally. Tumors were not found elsewhere in the body.

Brain Involvement.—Within the depression produced in the brain by the tumor was a large bundle of degenerate trigeminal root fibers. In spite of their great distortion and compression, the middle and anterior cerebellar peduncles consisted predominantly of normal fibers (fig. 5). On the affected side, the motor nucleus of the fifth nerve was composed of typically degenerate cells. The descending tract (sensory) of this nerve was partly degenerate as far caudally as the lower pontine

Fig. 5—Drawing of pontine level of brain stem: (1) depression produced by tumor, (2) degenerate right trigeminal nerve root, (3) descending tract of left trigeminal nerve, (4) brachium conjunctivum, (5) brachium pontis, (6) fourth ventricle, and (7) cerebellum.

level, beyond which it appeared normal, presumably as a result of accessions from ganglia of the seventh, ninth, and tenth cranial nerves. The flocculus and the vestibular nuclei, as well as the various motor tracts in the brain stem, appeared histologically normal.

Discussion

Circling that characterizes cerebellopontine angle lesions is usually of an incoordinate, ataxic type accompanied by tilting of the head and rolling movements.[12] A more deliberate type of circling is characteristic of anterior fossa disturbances. Since the circling in this case was of the latter type, it was assumed to be caused by ventricular pressure on the forebrain rather than by direct encroachment of the tumor on the cerebellopontine area. This is further suggested by the absence of degenerate fibers in the three cerebellar peduncles.

That paralysis was more pronounced than desensitization was supported by the observation that the motor root was more seriously affected than the sensory. It is remarkable that the tracts displaced by the tumor remained healthy in spite of great compression.

Summary

Intracranial nerve root tumors, especially those of the trigeminal nerve, have been reported infrequently. Those that have occurred were usually of sheath cell origin and could be classified as neurilemmomas or neurofibromas depending on the cellular arrangement and the relation of the tumor to the nerve fibers.

A tumor of the intracranial portion of the trigeminal nerve in a dog, resulting in paralysis of the muscles of mastication, is reported. The tumor is classified as a neurofibroma. Its effects on adjacent brain structures are recorded.

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Canine Mastocytoma.—Mastocytoma occurs frequently in middle aged or old dogs, especially in Boxers. These neoplasms may be multiple, may metastasize, and do not have dominance as to sex. Three types are recognized: Type 1 is a firm tumor, covered by black pigmented, hairless skin, which may enlarge up to 3 cm. and remain intact for several years, or it may suddenly commence to grow rapidly, ulcerate, and metastasize. Type 2 grows rapidly, is nondepilated, and may be soft, pseudofluctuating, and infiltrative. Type 3 is a granulative lesion that reappears following surgery. The preferred treatment for mastocytoma is surgical.—*Bengt Larsson in Nord. Vet.-med. (April, 1957): 241.*

Residual Effects of Lightning Injury.—A man, 36 years old was hospitalized for 32 days after being struck by lightning. Both heels were burned, he was unable to move his legs, his arms were weak, and he was blinded, but vision returned gradually after three weeks. A year later, his scalp was sensitive, there was pain at the fourth thoracic vertebra, and he had developed a persecution complex.

Microscopic changes have been demonstrated in the nervous system of persons dying from lightning stroke. Clinical sequelae may last for months or be permanent. They may include flaccid paralysis, sensory loss, papilledema, optic atrophy, and mental changes.—*J.Am.M.A. (May 4, 1957): 118.*

Klebsiella Mastitis and Calf Infection

Mastitis developed in 4 cows and systemic infection in several calves, all due to Klebsiella, on a dairy farm in Scotland. A heifer placed in the milking herd after her first parturition, lost condition for two weeks, then showed mastitis. The milk was yellowish brown, the next day the quarter was swollen and sensitive, but there were no systemic changes. The heifer was isolated at a distance and her milk was fed to 6 calves. In 12 days, a cow which had been stabled near the heifer and had calved six months previously, was similarly affected. Two months later, a cow in another stable, fresh for ten months, developed a similar mastitis and was sent to market. Soon afterward, another heifer which had not been in the stable until she calved, three days previously, showed changes in her milk but not in the quarter.

A gram-negative, capsulated rod was isolated from the affected quarters of the 4 cows. The first heifer was given local treatment with neomycin sulfate (500 mg.) ointment, daily for three days; the cow was given chlortetracycline, 2 doses (2.5 Gm.) intramuscularly and 2 doses locally; and the last heifer was given 5 doses of chloramphenicol locally at 12-hour intervals. Lactation practically ceased but the secretion was sterile in all three quarters in a few days. Of the 6 calves, 14 days old, which were fed infected milk, all remained well except 1 which developed a nasal discharge two weeks later, but quickly recovered. Klebsiella were cultured from the discharge. However, 3 calves only a few days old, in an adjacent pen, then developed diarrhea and pneumonia, and died in two to ten weeks. These, and the calf from the last heifer, yielded Klebsiella at necropsy.—*F. White in Vet. Rec. (June 1, 1957): 566.*

Parturient Paresis

Clinical observations on 67 cows with parturient paresis, in England, are reported. In two thirds of those affected for the first time, it occurred at the fourth or fifth parturition, the range being from the second to the eleventh parturition. Twenty had been affected previously, 7 at consecutive parturitions. The interval from calving to the first observed signs of paresis was from 0 to 72 hours (av. 21 hr.) with only 1 case noticed after 48 hours. Relapses occurred in 30 per cent, in 10 to 96 hours (av. 33 hr.) after previous recovery.

The initial signs observed included depression (48%), excitement (22%), and coma (30%). Cows showing excitement were not hypersensitive but appeared to be delirious, showing difficulty in maintaining balance or concern at inability to rise. Early signs included "stilting" with the angle of the hock eliminated (19%) and tremor of the hindquarters (3%). The heart rate averaged 80 beats per minute; in 10 cows (7 excited and 3 comatose), it

was over 100 beats per minute. The initial recorded temperature was below 100.5 F. in only 25 per cent. The pupil failed to constrict to light in 65 per cent. The serum calcium level averaged 4.4 mg./100 ml. (normal, 8.5 to 11.5), the serum magnesium averaged 3.1 mg./100 ml. (normal, 1.8 to 3.2), and inorganic phosphorous averaged 1.9 mg./100 ml. (normal, 3.5 to 6.0).

Of the 20 cows in which relapses occurred, only half had been completely milked. Calcium borogluconate therapy (350 cc., 25%) was satisfactory in 80 per cent whether given intravenously, subcutaneously, or by both methods. In an attempt to prevent paresis, 1 cow which had been affected about 24 hours after each of her third, fourth, fifth, and sixth parturitions was given crystalline dihydrotachysterol (9 mg.) intramuscularly eight hours after parturition and remained normal. Another, which had paresis about two hours after her third, fourth, and fifth parturitions, was given the same treatment 16 hours before parturition and remained normal. However, a third cow developed paresis 19 hours after a similar injection and had a relapse 24 hours later.—*L. A. Hemsley in Vet. Rec. (April 27, 1957): 464.*

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Calcium Therapy in Parturient Paresis.—To study blood levels and urine excretion of calcium, at Washington State College, 14 cows with parturient paresis, 5 normal parturient cows, and 3 normal parturient heifers were given calcium borogluconate solution (0.5 ml./lb. body wt.) intravenously in concentrations of either 32.7 or 25.5 per cent. The affected cows showed signs of paresis an average of nine hours after calving and the normal animals were treated 12 hours after calving. The initial rise in blood serum calcium was higher with the more concentrated solution, but four to ten hours later there was little difference. Likewise, the urinary calcium was higher for about 12 hours in cows given the more concentrated solution.

Half of the affected cows given each solution had relapses, their calcium blood levels dropping slightly lower than when first treated. Of the 3 normal parturient cows given the 32.7 per cent solution, 2 (fourth parturition) developed paresis in about 35 hours after injection; the third (third parturition) remained normal. Of the 3 parturient heifers similarly treated, 1 showed a slight depression in serum calcium and appeared extremely tired 24 hours after injection. The other 2 remained normal.

These data indicate that there is no advantage in using the more concentrated solutions; also, that the injection of calcium solutions may actually precipitate paresis.—*J. Dai. Sci. (May, 1957): 477.*

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Preventing Parturient Paresis.—Parturient paresis is a metabolic disturbance which undoubtedly represents a stress condition caused by hypocalcemia. It has been prevented by the prepartum feeding, for three to eight days, of 30 million units of vitamin D daily which produces a slight calcemia, and a marked increase in calcium absorption. Calcium digestibility was increased from 33 to 51 per cent during five days of vitamin D feeding, and remained high for five days afterward. This paresis has also been prevented by feeding rations low in calcium and high in phosphorus for a month before calving. However, in order to allow adequate weight gain and avoid subsequent reduced lactation, a liberal calcium intake should be allowed for several months prior to using the low calcium ration.—*Nutr. Rev. (June, 1957): 175.*

Control of Anaplasmosis.—Fairly dependable methods of identifying and treating cattle which are carriers of anaplasmosis have been developed. Research continues on development of a vaccine or other means of prevention and on means of eradication. A complement-fixation test is being used in a few herds. In Hawaii, where insects which spread the disease are rare, a program of eradication is underway. Tetracyclines can eliminate the infection in carriers but the cost is prohibitive ($60 to $100 per head). Anaplasmosis has been identified in 38 states, chiefly the coastal states.—*K-State News Bureau, Manhattan, Kan., June 13, 1957.*

A chemical (AET) was 100 per cent effective in protecting mice and monkeys against death from lethal doses of radiation. The blood cell counts dropped but were normal 65 days later. The compound is excreted almost immediately but means will be found to prolong its action.—*Sci. News Letter (June 15, 1957): 374.*

Nematodiases in Zoo Animals—A Preliminary Report

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DURING THE SUMMERS of 1955 and 1956, the authors pursued a survey of nematode parasites in captive animals at the Chicago Zoological (Brookfield) Park. Incidence of infection was determined from examination of fecal samples and necropsied animals. Observations were made of 1,574 fecal samples from 626 individual amphibians, reptiles, birds, and mammals, or an average of 2.5 analyses for each animal observed. Flotation techniques with zinc sulfate, sodium nitrate, or sugar solutions were employed. Fecal samples were collected before 10:00 a.m. and examined for nematode eggs and larvae on the day of collection. When animals passed adult worm specimens, either spontaneously or after anthelmintic administration, these results were also recorded.

TABLE 1—Animals Examined for Evidence of Nematode Infection

Classification	No. examined	Total
Aves	26	26
Reptilia	19	19
Amphibia	5	5
Mammalia		576
Monotremata	1	
Marsupialia	19	
Placentalia		
Primata	173	
Carnivora	155	
Artiodactyla		
Ruminants	111	
Nonruminants	19	
Rodentia	40	
Perissodactyla	46	
Insectivora	5	
Xenarthra	3	
Hyracoidea	1	
Proboscidea	5	
Lagomorpha	2	
Total vertebrates		626

RESULTS

The incidence of infection among the animals observed was found to be 53.7 per cent. Although 1,036 fecal samples were analyzed in 1955 and 538 in 1956, and the surveys were conducted independently, with some variations in flotation technique employed, the average incidences for each summer were strikingly similar (53.1 for 1955 and 54.6 for 1956). The vertebrate groups of hosts represented are presented (table 1). Since most of the animals observed were placental mammals, a breakdown to orders is presented for this group. The incidence of single and multiple infections is also shown (table 2).

The incidence of nematode infection by nematode family or genus is shown (table 3). Since specific identity was not always possible from observation of eggs or larvae, or both, infections are given in the larger taxonomic categories.

Although various other helminth (flukes, tapeworms) parasites were recovered, nematodes were by far the most numerous.

TABLE 2—Number and Percentage of Animals with One or More Nematode Infections

Number of nematode species per animal	Animals infected					
	1955		1956		1955 and 1956	
	No.	Per cent	No.	Per cent	Total	Per cent
1	142	63.4	62	55.4	204	60.7
2	53	23.7	32	28.6	85	25.3
3	18	8.0	8	7.1	26	7.7
4	8	3.6	7	6.25	15	4.3
5	2	0.9	2	1.8	4	1.2
6	1	0.4	1	0.89	2	0.6
Totals (animals infected)	224		112		336	100

Most captive animals have parasites from the geographical region where they were captured. Mortality due to parasitism is generally heaviest among recently arrived animals. This is not to say that occasional heavy infections do not occur in long-time residents of a zoological park. For example, a Grevy zebra (*Dolichohippus grevyi* Oustalet), in the park for nine years, passed 256 *Parascaris equorum* specimens after administration of piperazine adipate at a dosage of 220 mg./1 kg. of body weight.

Dr. Jaskoski is associated with the Department of Biological Sciences, Loyola University, and Chicago Zoological Park; and Dr. Williamson is veterinarian in charge, animal hospital, Chicago Zoological Park, Brookfield.

TABLE 3—Number of Animals Infected with Nematode Species and Percentage of Infection with Each Species

Nematode	No. animals infected	Per cent of animals infected with each nematode group
Strongylidae*	140	38.7
Ascaridae	69	19.0
Trichostrongylidae†	42	11.6
Ancylostomidae‡	39	10.8
Strongyloides spp.	39	10.8
Trichuris spp.	24	6.6
Enterobius spp.	7	1.9
Gongylonema sp.	1	0.3
Physaloptera sp.	1	0.3
	362 ‖	100

*Includes Strongylus, Oesophagostomum, Chabertia, and members of the subfamily Cyathostominae.

†Includes Haemonchus, Trichostrongylus, Cooperia, Nematodirus, and Ostertagia spp.

‡Includes Ancylostoma, Necator, and Bunostomum spp.

‖ Since some animals were infected with more than one species of parasite in more than one family, these animals were counted more than once. Thus, the total of 362 represents infections by specific parasites, rather than the total number of animals infected (336).

A Bengal tiger (*Felis tigris* Linnaeus), received in August, 1955, was thin (104 kg.) and listless on arrival. Piperazine adipate was administered in a dosage of 450 mg./5 kg. of body weight. After passing 215 Toxocara specimens, the animal improved rapidly.

The high incidence of nematode parasitism is not alarming. The extent of individual infection is far more important. This is particularly true of certain hoofed mammals which harbor strongyles or Trichuris, or both. The giraffe and okapi are particularly susceptible to strongyliasis. Since 1954, when the deaths of 2 giraffes were diagnosed as due to strongyliasis and trichuriasis, special precautions in management have prevailed. After the deaths of the giraffes, the grounds were ploughed, salted, and covered with sand. The pens were washed down, scrubbed, and painted and a layer of asphalt was applied to the pen floors to keep hoofs worn down.

A small female Masai giraffe (*Giraffa c. tippelskirchi* Matschie) and a pair of mature reticulated giraffes (*Giraffa c. reticulata* De Winton) make up the present giraffe colony. Although eggs of strongyles and Trichuris appear in fecal samples, the numbers have been so consistently low that the infection is by no means serious. The 3 giraffes appear in excellent condition. This is likely due to the sanitary measures indicated above, as well as provision for a dietary supplement of a mineral-vitamin mixture, with trace mineral salt added. The worm burden of a male and a female okapi (*Okapi johnstoni* Sclater), that were added to the collection in 1955 and 1956, has been reduced to significantly lower numbers. These specific problems will be a part of another report now in preparation.

Pasteurella Multocida Empyema in Man.—An elderly man who lived with 2 cats, and who had shown signs of chronic bronchitis and pneumonitis, was found to have empyema. Thoracentesis on the right side produced 350 ml. of an odorous seropurulent fluid. *Pasteurella multocida*, which resembled strains obtained from cats and patients bitten by cats, was recovered. The organism probably had been present in the bronchial tree as a saprophyte or as a low-grade pathogen for some time.—*New England J. Med. (May 23, 1957): 979.*

Liver Phase of Strongylus Edentatus.—Six strongyle-free pony and donkey foals, 1 to 2 months old, were infected orally with 7,000 to 25,000 *Strongylus edentatus* larvae, then killed 6, 9, 11, 19, 36, and 66 days later. Necropsy findings indicated that third-stage larvae burrow into the wall of the gut and reach the liver through the portal vessels; there they become enclosed in nodules during the third molt (11 to 18 days after infection). Fourth-stage larvae wander through the liver parenchyma, then migrate between the peritoneal layers of the liver ligaments to the tissues under the parietal peritoneum. During the liver migration stage, they may cause colic, anemia, and loss of condition in the foals.—*Vet. Bull. (May, 1957): Item 1486.*

Hypoderma Lineatum in the Esophagus of Cattle.—Observations on 5,803 bovine esophagi in Lyon, France, from 1952 through 1954, showed that the large number of larvae present could cause an esophagitis which might affect the health of the animals. This could occur before as well as during the time the "warbles" were developing in the back.—*G. Peres in Rev. méd. vét. (Feb., 1957): 99.*

Tranquilizer drugs used without supervision by "happy pill" addicts may someday pose a serious danger to public health. —*Antibiot. Med. and Clin. Therapy (May, 1957): 296.*

Parasitosis in a Musk Ox

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On Aug. 22, 1955, a dead musk ox (fig. 1) was submitted to us for necropsy. Because the musk ox is an exotic animal, and because this one harbored parasites that are commonly found in domestic ruminants, we feel that this report should be presented.

CASE REPORT

The musk ox was a 15-month-old, 400-lb. female that had died after a two-day illness, during which she was off feed and became recumbent. Examinations by two local veterinarians revealed that she was anemic and had a heavy trichostrongylid infection; therefore, intravenous supportive therapy was given.

At necropsy, the musk ox appeared to be in good physical condition but all the internal organs were pale. The abomasum contained masses of stomach worms admixed with small blood clots and ingesta. There were 4 tapeworms (each about 4 ft. long) in the jejunum about 18 ft. posterior to the abomasum, and the bronchi contained several lungworms. The stomach worms had a "barber-pole" appearance, resembling *Haemonchus contortus* commonly seen in sheep. In view of the signs and lesions, a diagnosis of acute stomach worm disease (haemonchosis) was made.

The 2 remaining musk oxen in the herd were treated with phenothiazine immediately and moved to new quarters a few days later. Within a week, their infections of stomach worms—as judged by the fecal sugar-flotation method for ova—changed from heavy to light. Structures resembling lungworm (Dictyocaulus) larvae and coccidia were also found in their fresh feces.

Subsequently, the helminths were identified* as follows: stomach worms—*H. contortus*, bovine strain *Haemonchus placei;* tapeworms—*Moniezia expansa;* lungworms—*Dictyocaulus viviparus*. No record was found of lungworms in musk oxen.

DISCUSSION

The 3 musk oxen were brought to Huntington Center, Vt., on Sept. 2, 1954, when about 3 months old. They had been caught on barrens 500 miles northeast of Yellowknife, District of Mackenzie, Canada. Fecal tests upon arrival revealed a few ova resembling those of stomach worms. Until the next spring, they were kept in isolation on the farm. They were fed a dairy calf milk substitute, a grain mixture having 8 per cent crude protein, poor hay, willows, iodized salt, and trace minerals.

Fig. 1—A female musk ox (Ovibos moschatus), 15 months old.

In the summer of 1955, they were put on a dry 22-acre pasture with Aberdeen Angus heifers and Toggenberg goats. Examinations of the feces of the heifers and goats were said to have been negative for parasites, and the animals had been treated with phenothiazine as a further precautionary measure. Consequently, the musk ox calves probably became infected with the parasites in their native environment. Then, the development of a large number of stomach worms, sufficient to produce disease, took place here as it does in sheep. Furthermore, it appeared that the stomach worms spread to the Aberdeen Angus heifers because 2 of the 4 had moderate infections two months after the illness in the musk oxen. The 1 goat tested was negative.

Four more musk ox calves were brought to Vermont in September, 1955. Fecal tests upon arrival revealed a few stomach worm-like ova in 2 and coccidia in 1. All the musk oxen have been treated with phenothiazine every three weeks since then and have remained healthy. There has been no clinical

From the Department of Animal Pathology, University of Vermont, Burlington.

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*The authors thank Mr. Allen McIntosh and Mrs. M. B. Chitwood, Animal Disease and Parasite Research Branch, U.S.D.A., Beltsville, Md., for identifying the helminths mentioned.

evidence of lungworm or tapeworm infection.

SUMMARY

Stomach worms, tapeworms, and lungworms were found in a musk ox. Stomach worm disease (haemonchosis) caused the death of the animal.

The Use of Chickens in the Differential Diagnosis of Vesicular Exanthema and Vesicular Stomatitis—A Preliminary Report

A. A. HOLBROOK, D.V.M. and
W. C. PATTERSON, V.M.D.

Beltsville, Maryland

One of the difficulties encountered in the field differentiation of vesicular stomatitis (VS) and vesicular exanthema (VE) is the lack of suitable test animals at the time and place needed. Skinner[1] found that chickens were susceptible to both foot-and-mouth disease (FMD) and vesicular stomatitis by intradermal inoculations of the tongue. There are no available data relative to the susceptibility of adult chickens to VE.

Three types of VE virus (A_{48}, B_{51}, and C_{52}) were inoculated intradermally into the dorsal and ventral surfaces of the tongues, hard palates, feet, wattles, and combs of adult New Hampshire Red chickens and susceptible control swine. No visible lesions were observed from these three types of VE virus. The swine reacted with typical lesions and a rise in temperature.

One strain of Indiana-type VS (Indiana laboratory) and 12 viruses of different origin (New Jersey-type VS) consistently produced vesicles on the dorsum of the tongues of the chickens when injected intradermally. Of the different sites of inoculation used, only those birds inoculated on the tongue developed positive lesions (fig. 1, 2).

Vesicle coverings were harvested from a group of chickens previously inoculated with New Jersey (Concan) VS virus, and a 5 per cent saline suspension was made. The suspension was inoculated intradermally into the dorsal surface of the tongues of chickens, the rear pads of guinea pigs, and into 8-day embryonating hens' eggs. Vesicles were produced in 24 hours on the chickens' tongues and in 40 hours on the guinea pig pads. The embryos died between 24 and 48 hours after inoculation. The amnioallantoic fluids were harvested and proved positive to New Jersey VS on the complement-fixation test.

Fig. 1—Typical vesicular stomatitis lesions on a chicken tongue.

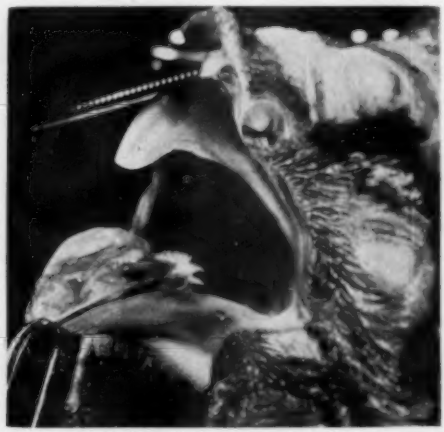

Fig. 2—Typical vesicular stomatitis lesions on a chicken tongue.

Although vesicles were produced by scarification and intradermal inoculations at numerous points with vesicular stomatitis virus, superior vesiculation was pro-

From the Animal Disease and Parasite Research Branch, ARS, U.S.D.A., Beltsville, Md.

[1]Skinner H. H.: Infection of Chickens and Chick Embryos with the Viruses of Foot-and-Mouth-Disease and of Vesicular Stomatitis. Nature, 174, (1954): 1052.

duced by intradermal tunneling with a 10 per cent suspension of vesicular material. None of the reacting chickens showed any systemic reactions or rise in body temperature. Several of the chickens reacting to the New Jersey-type virus proved to be immune when challenged with homologous virus.

As all this work was carried on in adult New Hampshire Red chickens and inoculations were made in a majority of birds by the intradermal route, further study is indicated in birds of different ages, species, and strains and by different routes of inoculation.

It would appear that adult chickens may be a valuable aid in the field differentiation of vesicular stomatitis and vesicular exanthema.

Erysipelas in Turkeys.—Experimental infection with *Erysipelothrix rhusiopathiae* of 732 turkeys indicated that young poults and adults were equally susceptible without regard to sex. Death losses following vaccination with a bacterin were 36 to 56 per cent less than in controls when challenged up to 20 weeks water. Bacitracin, oxytetracycline, furazolidone, and streptomycin gave inadequate protection when given to poults in feed or water. When turkeys 29 weeks old were fed chlortetracycline at 325 or 600 Gm. per ton, or procaine penicillin at 325, 600, or 800 Gm. per ton, the mortality from induced erysipelas was reduced by 30, 70, 60, 60, and 100 per cent, respectively. The morbidity in the penicillin-fed birds was also much lower. But when baby poults 5 weeks old were fed chlortetracycline or penicillin, 325 Gm. per ton, the mortality was less by 100 per cent and 40 per cent, respectively, than in controls.—*C. I. Boyer and J. A. Brown in Avian Dis., 1, (May, 1957): 42.*

Rabies in Canada.—Rabies has been officially reported in Canada in 32 of the last 47 years but, as in other world areas, the problem has changed. Not until recent years has it threatened livestock. A disease, known to the Eskimos for over 50 years as "wild fox disease" was diagnosed, in 1947, as rabies and, in 1952, it created a serious epizootic in the Northwest territories (*J.A.V.M.A.*, Oct., 1954: 316-326). Wildlife was reduced below the supposed threshold level for the spread of rabies (some doubt the effectiveness of this procedure).

In Ontario, rabies was diagnosed in a fox late in 1954 and spread southward. Of 137 positive cases in Ontario in the year ending March 31, 1956, only 16.8 per cent were in dogs and 64.9 per cent in wildlife, mostly foxes. In the first four months of 1957, 85.2 per cent of all cases were in wildlife, and doubtless only a small portion of the cases were diagnosed.—*K. F. Wells in Canad. J. Pub. Health (June, 1957): 239.*

Rabies in a Dog Vaccinated Ten Months.—A Boxer vaccinated for rabies with a phenolized product showed typical signs of rabies (and Negri bodies) ten months later. Possible reasons for immunization failure include: too small a dose of vaccine, an overwhelming exposure, and exposure prior to vaccination.—*Anim. Dis. Trends (May, 1957).*

Survival of Lungworms.—The larvae of the hairlike lungworm, *Muellerius capillaris*, which commonly infects sheep, cattle, and other animals, is found to survive for several months in the feces and does not pass on to the herbage. It lives longer in dry feces and at low temperatures (37 to 42 F). It has considerable resistance to desiccation, is killed rapidly by sunlight, and will survive continuous freezing for three days but not for 12 days.—*J. Helminthol., 31, (1957): 17.*

Virus Pneumonia in Goats.—Many goats imported from the United States to Japan, in 1945, died of so-called "shipping fever," and a number of recovered pathogenic bacteria were suspected of being responsible for the suppurative pneumonic lesions. The disease still causes serious losses, especially in newborn kids which die or fail to grow. A virus morphologically similar to the psittacosis-lymphogranuloma group has now been isolated from naturally infected goats. It is infective to cattle, rabbits, dogs, chickens, guinea pigs, hamsters, and mice by tracheal inoculation. It is especially pneumotropic and causes grayish white, translucent, and granular specific pneumonic lesions. Multiplication of the virus is prevented by chlortetracycline.—*Y. Saito in Kitasato Arch. Exptl. Med. (Nov., 1954): 27.*

Putrefaction in the Rumen

Samples of rumen content were routinely taken for two years from cows brought to the clinic at the Royal Veterinary College, Stockholm, Sweden. Many samples had an abnormal odor and showed a rise in coliform bacteria. Proteus of different types, not normally present, were often observed. When putrefaction was severe, there was often a marked decrease in the number of Infusoria. The ill effects were presumably due to toxins produced by bacteria which were possibly eaten with brewers' grain, bad silo fodder, rotten potatoes, or excessive protein; or from poor water hygiene.

The clinical picture in these animals varied but recurrent diarrhea was common. Many cases were subclinical until parturition when a severe acetonemia, fatty changes in the liver, and a paresis-like condition often occurred, frequently followed by retained fetal membranes, metritis, and poor fertility. Severe acute mastitis resembling *coli* or Klebsiella infection often occurred.

In bulls, the semen quality often was lowered but improved quickly when conditions in the rumen were changed. Steers with joint affections, resembling rickets but without bone changes, usually improved rapidly when the character of the rumen content was changed. A frothy bloat has been seen in cows which were fed rotten potatoes.

Therapy consisted of lactic acid given orally (100 Gm./10 liters of water) or mixtures containing ascorbic acid, followed by giving cud from healthy cows.—*G. Brobergin in Nord. Vet.-med. (Dec., 1956): 935.*

Are Antibiotics Produced in the Rumen?—When poor quality water or spoiled hay, grain, or silage is given to ruminants, digestive disturbances and intoxications occur in some individuals but not in others. This suggests that microorganisms present in the rumens of some animals might produce antibiotics. Also, when cultures of *coli* bacterial and *Clostridium welchii* were introduced through a rumen fistula, they failed to cause changes in animals with a normal rumen flora. Bacteria (*Pseudomonas aeruginosa, Bacillus subtilis,* and 1 unidentified bacterium) taken from these animals showed antibiotic-producing properties while organisms from animals which showed digestive disturbances usually produced no antibiotics.—*Nord. Vet.-med. (April, 1957): 257.*

Effect of Acid Salts on Ruminants.—When solutions of acetate, propionate, and butyrate alone and in combinations were introduced into the rumen of sheep, acetate caused a slight and delayed rise in blood ketone bodies without affecting blood sugar; butyrate caused a sharp rise in ketones with a fall in sugar; and propionates, when given with butyrate, had a strong antiketogenic action and caused a marked rise in blood sugar.—*Onderstepoort J. Vet. Res., 27 (1956): 101-109.*

Source of Isopropanol in Ruminant Ketosis.—The isopropanol which is found in the blood, urine, milk, and ruminal fluids of ketotic cows and sheep, probably arises as follows: acetone from the blood is excreted in large amounts in the saliva, swallowed, and reduced to isopropanol by the rumen bacteria. Other factors which have a depressant effect on the nervous system probably operate simultaneously.—*H. J. Adler, Cornell Thesis, 1955.*

The Role of Gravel in the Gizzard.—A fluoroscopic study of the gizzards of hens shows that gravel particles are far apart during digestion and do not grind the feed. When no gravel was available, it disappeared from the gizzard in two months but the hens remained thrifty.—*Bull. Soc. Sci. (Nancy), 12, (1953): 5-9.*

Fungi and Ruminant Digestion.—Most of the fungi isolated from the rumen liquid of sheep belonged to the Mucoraceae, which grow as yeastlike cells. Two of the fungi, *Absidia ramosa* and a Fusarium strain, found in 21 of 23 sheep, were able to reduce nitrates and nitrites and probably are of importance in sheep rumen digestion.—*Holtenius and Nielsen in Nord. Vet.-med. (March, 1957): 210.*

Stabilized animal fat can be safely fed to dairy cows whether on or off pasture but it causes no significant increase in the yield of milk, the percentage of milk fat, or in the components of the butterfat. It does not alter the carotene and vitamin A values of milk or blood plasma.—*J. Dai. Sci. (Oct., 1956): 1461.*

The 1955-1956 Survey of Veterinary Practitioners—Part 2

The information obtained through the surveys conducted by the AVMA Committee on Veterinary Service (Kilpatrick Report*) and reported in this series† of editorials relates almost entirely to income received by veterinary practitioners.

Of those reporting, 74 per cent gave practice as their sole source of income and most of them (78%) practiced alone. Of the 22 per cent (585) participating in partnership or group practices, most (79%) were in two-man practices; 16 per cent were in three-man practices; and 5 per cent practiced with three or more other veterinarians.

Like other groups, veterinarians have markedly different earning powers. Talent, age, nature and prosperity of clientele, type of practice, size of community, and geographic peculiarities are some of the factors which may affect earning capacity.

Veterinary practice differs from most professional services in that it usually requires a greater investment in buildings and facilities. Of those reporting, 71 per cent owned the buildings used for conducting their practices and one half of these indicated that this investment was in excess of $30,000. Few physicians, dentists, or lawyers find such an investment necessary.

Automobiles, overhead, and supplies are other major expenses in veterinary practice. Two thirds of those in rural practice report a maximum one-way mileage per call of 6 to 25 miles. Only one third could practice within an average of 5 miles of their office.

Overhead costs (office and business expense, utilities) ranged from $500 to more than $6,000 per veterinarian. Supplies (drugs, biological products, etc.) which are relatively minor items in medical, dental, or legal practice cost from $1,000 to $10,000, or more, annually. These expenses show some regional differences (fig. 1), the average total being approximately $10,000. They are somewhat less in the Southeast and Southwest. In the Northeast and Middlewest where they are highest, these three items of expense differ markedly in proportion. The cost of biological products and drugs is quite high and overhead is low in the Middlewest; in the Northeast, these items are reversed.

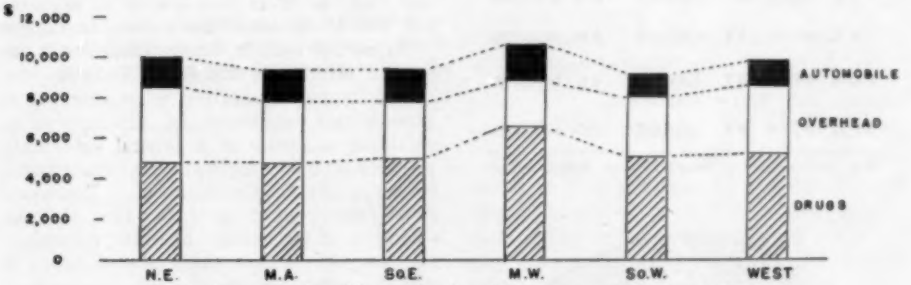

Fig. 1—Average automobile, overhead, and drug expense by regions—1955.

Age and Hours Worked

The report showed no significant differences between regions with regard to age or hours worked.

The age distribution pattern (fig. 2) indicates a marked shift to youth in recent years. While the age distribution shown may be typical, it is undoubtedly influenced by two factors: (1) The survey was limited to AVMA members and a higher percentage of younger men belong to the AVMA. (2) Younger men are more inclined to respond to statistical surveys.

The survey revealed that veterinarians work long hours (fig.3). For every eight hours the typical nonprofessional person works, the typical practitioner devotes 13

*Dr. W. J. Kilpatrick, Mediapolis, Iowa, was chairman of the subcommittee that prepared the questionnaire.

†Part 1 of this series appeared in the Aug. 1, 1957, issue, pp. 156, 157.

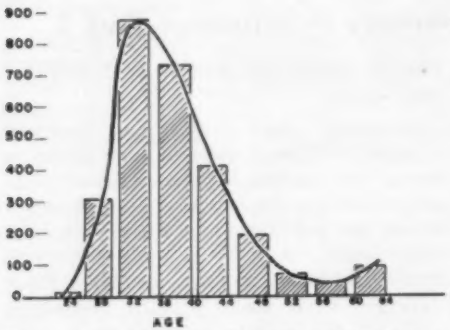

Fig. 2—Age distribution of 2,733 veterinarians in practice included in the 1955 survey.

5%	WORK AT LEAST	90	HOURS
18%	WORK AT LEAST	80	HOURS
41%	WORK AT LEAST	70	HOURS
72%	WORK AT LEAST	60	HOURS
88%	WORK AT LEAST	50	HOURS
95%	WORK AT LEAST	40	HOURS
97%	WORK AT LEAST	30	HOURS

Fig. 3—Number of hours a week veterinarians work.

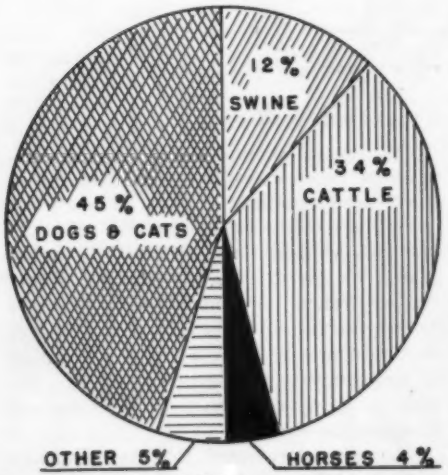

Fig. 4—Percentage of U.S. total gross income from veterinary practice by class of animal treated—1955.

hours to his veterinary practice. The hours of work reported by veterinarians in the Northeast (69) and Middlewest (68) were significantly greater than those reported in the West (62) and the Middle Atlantic regions (53). This undoubtedly varies with the type of practice. No attempt was made to determine the relationship of hours worked to net income.

Type of Practice

The percentage of gross income derived from practice with the various classes of animals is indicated (fig. 4). Of the total U. S. veterinary income reported, 45 per cent was derived from pet animal practice. This varied considerably between regions and between states within a region. Income from swine practice is almost nonexistent except in the "cornbelt," while that from cattle practice is about the same in all regions. The percentage of gross income from pet animal practice ranges from a high of 55 per cent for the Northeast and the West to a low of 28 per cent for the Middlewest. By states, it ranged from 86 per cent in Rhode Island to 8 per cent in Minnesota and South Dakota.

The danger of dealing with averages is immediately apparent in attempting to establish a profile of a typical veterinary practice on a species basis. On a state basis, Georgia, North Carolina, and Tennessee most closely conform to the national averages of percentage of gross income by species, yet, within these states, there is a wide difference in these percentages.

In spite of these differences, an attempt has been made to answer the frequent question of "Which type of practice returns the greatest net income?" Two bases for measurement were provided by the data: (1) percentage of gross income from pet animal practice; and (2) the average net income reported by states. The reliability of this analysis depends almost entirely on the question of whether state averages can be used as a statistic.

A scatter diagram (fig. 5) depicts the relationship between the average net income of veterinarians in a state and the percentage of gross income derived from pet animal practice in that state.

This method of statistical analysis is used to measure the extent to which cer-

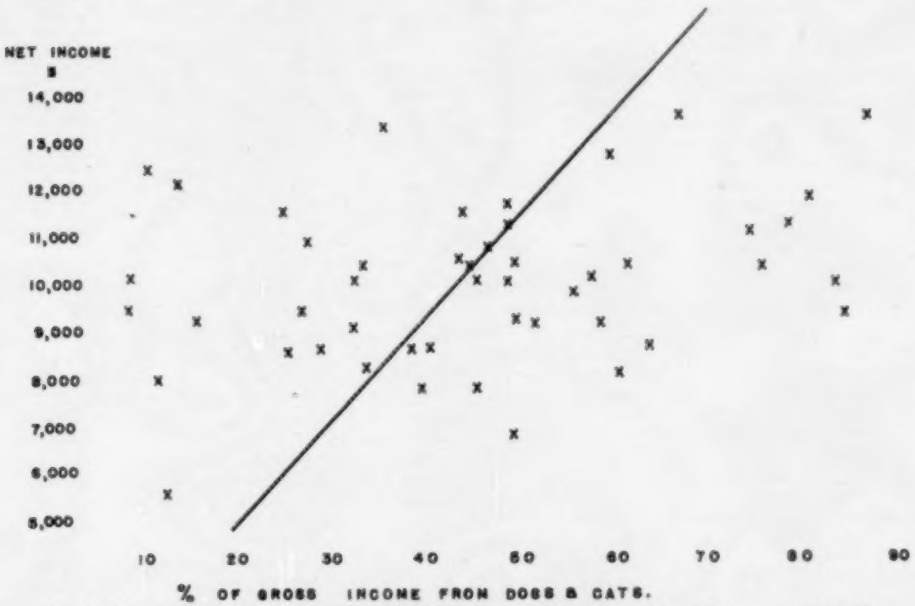

Fig. 5—Relationship between average net income of veterinarians in a state and the percentage of gross income derived from dog and cat practice in that state.

tain factors follow a trend; the deviations from the regression line measures the failure of these factors to conform to the indicated trend. If the deviations are great, as in this case, there is little or no relationship (the slope of the regression line is irrelevant).

Apparently, the average income of veterinarians in a state is not dependent on the percentage of income from pet animal practice in that state.

Since net income does not vary consistently with the class of animals treated, other causes of disparity should be analyzed. The next in this series of editorials will discuss the matter of fees for veterinary services.

World-Wide BCG Vaccination Program.—The tuberculosis control program, started in 1951, has increased annually and has resulted in 162 million people having been tuberculin tested and 60 million vaccinated. Most of the work has been done in Asia (93%), particularly in India (49%). Colombia leads on the western hemisphere (2.7%). All applicants are first intradermally tuberculin tested and only nonreactors are vaccinated. Positive reactions range from a low of 13 per cent in Costa Rica to 77 per cent in Hong Kong. Actual experiences with tuberculosis is probably lower since some reactions were doubtlessly due to a low grade, nonspecific sensitivity to tuberculin which exists in man in many parts of the world. Of those vaccinated, 32 per cent were under 7 years, and 22 per cent were 15 years or older.—*Chron. WHO (May, 1957): 140.*

Is Canine Distemper Related to Rinderpest?—At Kabete, Kenya, where the carcasses of goats used in the production of rinderpest vaccine were regularly fed to the many dogs on the estate, it was noticed that they were resistant to canine distemper. When 4 pups, raised in isolation, were given three injections of virulent rinderpest virus at 11-day intervals, then two weeks later these principals and 4 control pups were injected with virulent distemper virus, the principals remained essentially normal while the controls developed typical distemper.—*J. B. Polding and R. M. Simpson in Vet. Rec. (June 8, 1957): 582.*

Current Literature

ABSTRACTS

Plate-Agglutination Test for Brucellosis

Acidification of the plate test antigen (10% by volume, washed and heat-killed *Brucella abortus* cells) with 0.08 ml. glacial acetic acid per milliliter of antigen results in a pH value in the region of 4.0 of the serum-antigen mixture of the 1:25 dilution of the plate test (0.08 ml. serum and 0.03 ml. or 1 drop of antigen).

At pH 4.0, the agglutination reactions of a high percentage of serums of low titers (1:50 to 1:100) from otherwise negative herds are inhibited (nonspecific agglutinins), whereas agglutination reactions by serums of low titers containing specific agglutinins for Brucella are unchanged or changed to a moderate degree. That inhibition of the nonspecific agglutination reaction occurs at pH 4.0 is demonstrated by adding one drop of a saturated solution of sodium bicarbonate to the serum-antigen mixture after the normal 15-minute incubation period of the test to neutralize the acid. Agglutination follows within a minute or two.—[*Joseph E. Rose and Martin H. Roepke: An Acidified Antigen for Detection of Nonspecific Reactions in the Plate-Agglutination Test for Bovine Brucellosis. Am. J. Vet. Res., 18, (July, 1957): 550-555.*]

Differences Among Strains of Leptospira Pomona

A serological study on 23 strains of *Leptospira pomona* is reported. The serological screening of strains employed as antigens against a battery of serotype rabbit antiserums revealed minor differences in cross-agglutination reactions. Based on these differences, strains were selected for agglutinin-absorption studies. These studies disclosed the presence of four antigenically diverse serotypes.

The antigenic differences in strains may have an important bearing in epidemiological, chemical, serological, and vaccine prophylaxis aspects of *L. pomona* leptospirosis.—[*A. D. Alexander, L. B. Evans, and R. Marchwicki: Antigenic Differences Among Strains of Leptospira Pomona. Am. J. Vet. Res., 18, (July, 1957): 708-712.*]

An Abnormality of the Bovine Penis

The penis of an adult ox possessed a distinct urethral process resembling that of other members of the order Artiodactyla.—[*R. R. Ashdown: An Abnormality of the Bovine Penis. Am. J. Vet. Res., 18, (July 1957): 543-545.*]

Correction—Protection of Sheep from Beta (Heat) Radiation

The title of an abstract in the July 1 JOURNAL (p. 69), "Protection of Sheep from Heat Radiation," is in error. It should read *"Protection of Sheep from Beta Radiation."*

X Irradiation in Lambs

Six animals exposed to 30 r of x irradiation exhibited a significant depression in lymphocytes but showed no other signs of damage. A comparable group of animals exposed to 15 r resembled the control animals in all respects.—[*Lynn A. George, Jr., Patricia L. Hackett, and L. Bustad: Leukocytic Response in Lambs Exposed to Whole Body X Irradiation. Am. J. Vet. Res., 18, (July, 1957): 631-633.*]

Bacterial Flora of Chickens with Chronic Respiratory Disease

Twenty-nine strains of Escherichia sp. were isolated from 51 chickens affected with chronic respiratory disease. Other organisms isolated were Staphylococcus, Pseudomonas, Proteus, Aerobacter, Salmonella, Streptococcus, gram-positive bacilli, and yeasts. Pleuropneumonia-like organisms (PPLO) were isolated from seven tracheal exudates of the 51 chickens studied. Thallium acetate added to PPLO agar (1:2,000) failed to inhibit coliform organisms.—[*E. S. Biddle, and M. S. Cover: The Bacterial Flora of the Respiratory Tract of Chickens Affected with Chronic Respiratory Disease. Am. J. Vet. Res., 18, (April, 1957): 405-408.*]

BOOKS AND REPORTS

Salmonellosis in Animals

This book presents a most complete review of references concerning the group of organisms causing salmonellosis, with over 1,400 citations of the literature, covering their general characters, classification, and distribution among animals including horses and mules, cattle, sheep and goats, swine, dogs and cats, furbearing animals, reptiles, and insects. Research workers will find in this manual a most complete bibliography of the signs and lesions of Salmonella infections in animals, together with their epidemiology and public health aspects. —[*Salmonellosis in Animals. By A. Buxton. 209 pages. Commonwealth Agricultural Bureaux, Farnham Royal, Nr. Slough, Bucks, England. Price about $3.50.*]—CHARLES MURRAY.

Dictionary of Microbiology

This dictionary of terms is for use in the fields of microbiology, bacteriology, mycology, virology, cytology, immunology and immunochemistry, serology, and microscopy. It supplies basic information concerning the important microorganisms, culture mediums, staining, diagnostic tests, enzymes, and related information. It would be a valuable addition to libraries of schools and for research workers in diseases of animals and man.—[*Dictionary of Microbiology. By Morris B. Jacobs, Maurice J. Gerstein, and William G. Walter. 276 pages, more than 5,000 entries. D. Van Nostrand Co., Inc., Princeton, N. J. 1957. Price $6.75.*]

THE NEWS

Lt. Col. T. C. Jones, Pathologist at Angell Memorial Animal Hospital

Lieutenant Colonel Thomas C. Jones (WSC '35), U.S.A., retired from the Veterinary Corps of the U. S. Army to accept the position as pathologist at the Angell Memorial Animal Hospital, on July 1, 1957. Colonel Jones will also be a clinical associate in pathology at the Harvard Medical School and veterinary consultant to the Cancer Research Institute on Deaconess Road in Boston.

He has been chief of the Veterinary Pathology Section of the Armed Forces Institute of Pathology in Washington, D.C., where he was the original chief of this service from 1946 to 1950. Colonel Jones, co-author of two books, "Veterinary Necropsy Procedures" and "Veterinary Pathology," and author of numerous scientific articles, is well known as a lecturer before veterinary and medical groups.

During his Army career, Colonel Jones was officer in charge of the U. S. Army Veterinary Research Laboratories at Front Royal, Va., and at Fort Robinson, Neb. He was also chief of the Veterinary Department of the Fourth Medical Field Laboratory in Germany. On completion of his present tour of duty at the

Lt. Col. Thomas C. Jones

Armed Forces Institute of Pathology, he was awarded a certificate for distinguished achievement.

Colonel Jones is a charter member of the American College of Veterinary Pathologists and is its secretary-treasurer.

Colonel and Mrs. Jones and family reside on South Street in Needham.

Dr. W. W. Armistead Succeeds the Late Dean Clark at Michigan State

Dr. W. W. Armistead, until recently dean of veterinary medicine at Texas A. & M. College, has been appointed dean of the College of Veterinary Medicine at Michigan State University, succeeding the late Dr. C. F. Clark whose death occurred on July 28 following an illness of several months. Announcement of the appointment, effective August 10, 1957, had been made

Dr. W. W. Armistead

prior to the demise of Dean Clark who had requested that he be relieved of administrative duties.

Dr. Armistead, who received his D.V.M. degree from Texas A. & M. College in 1938, leaves his position as dean there after serving in that capacity since September, 1953. Following graduation, he engaged in general practice in Dallas for two years and then joined the clinical faculty at his alma mater. During World War II, he served with the Army Veterinary Corps, from 1942-1946, in the United States, North Africa, and Italy.

In addition to his veterinary degree, Dr. Armistead holds an M. S. degree from the Ohio State University (1950) and a Ph.D. degree from the University of Minnesota (1955). He is a member of the Texas Public Health Association, the New York Academy of Science, the Conference of Public Health Veterinarians, and the Animal Disease Research Workers in the Southern States. He is also a member of Sigma Xi, Phi Zeta, Phi Kappa Phi, Phi Eta Sigma, and Omega Tau Sigma fraternities.

Dr. Armistead was president of the Texas Veterinary Medical Association in 1947-1948 and is currently president of the American Veterinary Medical Association.

He becomes the sixth dean of the College of Veterinary Medicine at Michigan State University since it was established in 1909. The

late Dean Clark, under whose administration the veterinary medical program became one of the best in North America, joined the staff there in 1929 and became dean in August, 1951. It had been planned that he would become dean emeritus upon his retirement.

AMONG THE STATES AND PROVINCES

Florida

Dr. Pritchard to Head Department at University of Florida.—Dr. W. R. Pritchard (D.V.M., KSC '46; Ph.D., MIN '53), who assumed his new duties as head of the Department of Veterinary Science, University of Florida, on July 1, 1957, received his third earned doctors degree when he was awarded the degree Doctor of Jurisprudence, with distinction, at commencement exercises at Indiana University at Bloomington on June 10, 1957. A member of the staff of the Department of Veterinary Science, Purdue University, Dr. Pritchard attended evening classes at the Indianapolis Division, Indiana University School of Law. He led his class scholastically, was graduated with honors, and was elected to the Order of the Coif, a legal scholastic society.

Dr. W. R. Pritchard

Georgia

State Association.—The fifty-first annual meeting of the Georgia Veterinary Medical Association was held at the Georgia Center for Continuing Education on the University campus in Athens, June 23-25, 1957. There were 185 in attendance.

The program included the following out-of-state speakers: Drs. R. J. Anderson, A.R.S., Washington, D.C.; W. W. Armistead, president-elect of the AVMA, College Station, Texas; M. G. Fincher, Cornell University, Ithaca, N.Y.; Jack Knappenberger, Norden Laboratories, Lincoln, Neb.; T. L. Steenerson, Wilkinson, Ind.; and Douglas Watson, Virginia Polytechnic Institute, Blacksburg.

The highlights of the convention were the presentation of the Veterinarian of the Year Award, to Dr. W. F. McLendon, director of clinics at the School of Veterinary Medicine, University of Georgia, and a talk by the Hon. J. P. Campbell, Georgia commissioner of agriculture, at the association luncheon, at which the women were guests.

Officers elected for the ensuing year were: L. A. Mosher, Atlanta, president; W. A. Elinburg, Jr., Lawrenceville, president-elect; and A. M. Mills, Athens, secretary-treasurer-editor.

The next annual meeting will be held in Augusta jointly with the South Carolina Asscciation of Veterinarians.

s/CHARLES C. RIFE, *Retiring Secretary.*

Maryland

State Association.—The summer meeting of the Maryland State Veterinary Medical Association was held June 27, 1957, in Ocean City. Guest speakers included: Drs. Myron G. Fincher, Ithaca, N.Y.; W. W. Greene, College Park, Md.; Joseph A. Solomon, Warrensville Heights, Ohio; J. Markowitz, Toronto, Ont.; J. Hanley, Belair, Md.; E. E. Slater, Indianapolis, Ind.; D. K. Detweiler, Philadelphia, Pa.; and Wayne H. Riser, Skokie, Ill.

North Carolina

State Association.—There were over 135 veterinarians registered at the annual meeting of the North Carolina State V.M.A. in Ashville, June 25-27, 1957. The following speakers addressed the group: L. A. Branch, Franklin, Va.; W. O. Brinker, Michigan State University, East Lansing; Frank Kral, University of Pennsylvania, Philadelphia; F. C. Neal, Texas A. & M. College, College Station; W. H. Riser, American Animal Hospital Association, Skokie, Ill.; J. C. Siegrist, Schering Corp., Bloomfield, N. J.

At the banquet, attended by over 200, Dr. M. M. Leonard was presented with a plaque honoring him as North Carolina's Veterinarian of the Year.

The new officers are: D. C. Beard, Concord, president; B. H. Kinsey, Washington, president-elect; E. R. Swearingen, Smithfield, vice president; and D. J. Lange, Greensboro, secretary-treasurer.

The executive committee includes the following new members: W. R. Dobbs, Albemarle; C. C. McLean, Southern Pines; and R. W. Williams, Raleigh. Drs. E. W. Young, Mocksville, and W. A. Smith, Farmville, are the other members of this committee.

s/D. J. LANGE, *Secretary.*

Ohio

Practice Act Revised.—The efforts of many years work by members of the Ohio State Veterinary Medical Association bore fruit early in June when Governor C. William O'Neill signed into law a revised practice act governing veterinary medicine in the state.

The new law becomes effective Jan. 1, 1958, and changes the name from Board of Veterinary Examiners to State Veterinary Medical Board. The membership of the Board has been increased from three to five members and the terms of office have been reduced from six to five years.

The power of the Board has been increased, with rather broad rule and regulation making powers conferred upon the Board by the Legislature. The new Board will have the right to issue reprimands, suspend and revoke licenses, dependent upon the nature of the offense. The old law had only revocation.

Issuing of licenses by reciprocity and the issuing of temporary permits is also included in the revised act.

What constitutes the practice of veterinary medicine has been clarified in the definition section and the penalty section has been stiffened. Thus, rather stiff penalties may be meted out to anyone who falsely represents himself as practicing veterinary medicine.

After Jan. 1, 1958, Board members, while in the official performance of their duties, will receive $25 for each day or portion thereof in addition to necessary expenses. The old law provided a daily payment of $15.

Left to right (seated)—Mr. Herman K. Ankeney, member, of the Ohio House of Representatives, who was the main sponsor of the bill; Governor O'Neill; Dr. Harry Geyer, chief, Division of Animal Industry of the Ohio Agriculture Department. Standing—Mr. Harry C. Sharp, executive secretary, and Dr. Russell E. Rebrassier, secretary, O. S. V. M. A.

The new Board shall have the right to conduct investigations and hold hearings and may issue subpoenas and require the production of records and other documents relative to the issue at hand.

Prior to its introduction into the Ohio General Assembly, the bill was taken before the membership of the Ohio State Veterinary Medical Association and had the support of the entire Association. Key members of livestock and farm groups were also enlisted for support.

During the course of the bill through the legislative machinery, the members of the O.S.V.M.A. were called upon to contact the representatives and senators from their home areas and urge them to support the bill.

It is the firm belief of those who handled the bill in the legislative halls that the support of the entire membership was instrumental in getting a modern practice act for the profession of veterinary medicine in the State of Ohio.

U. S. GOVERNMENT

Veterinary Personnel Changes.—The following changes in the force of veterinarians in the U. S. D. A. are reported as of June 4, 1957:

TRANSFERS

Walter Barngrover, from Sacramento, Calif., to Honolulu, Hawaii.

J. F. Carnes, from Denver, Colo., to Idaho Falls, Idaho.

Howard E. Ingram, from Denver, Colo., to Bismarck, N. Dak.

Allison P. McCottry, from South St. Paul, Minn., to Reading, Pa.

Peter T. Curran, from Newark, N. J., to Chester, N. Y.

George Vlalukin, from Cleveland, Ohio, to Cincinnati, Ohio.

Robert M. Clark, from Indianapolis, Ind., to Anderson, Ind.

Edward R. Betlack, from Cheyenne, Wyo., to Bismarck, N. Dak.

Daniel E. Brensike, from South St. Paul, Minn., to St. Cloud, Minn.

LeRoy V. Carlyle, from Honolulu, Hawaii, to St. Paul, Minn.

Robert S. Zenor, from Sioux City, Iowa, to Denver, Colo.

RETIREMENTS

Joseph R. Addison, Scranton, Pa.

Francis W. Beck, Chester, N. Y.

Byron J. Nutter, Anderson, Ind.

Clarence C. Walch, S. St. Joseph, Mo.

Ralph E. Nelson, Kansas City, Kan.

Russell B. Briney, Kansas City, Kan.

Floyd A. Scott, Austin, Minn.

DEATHS

Milton R. Sharp, Caldwell, Idaho.

COMMENCEMENTS

University of Illinois.—At the 1957 commencement exercises of the College of Veterinary Medicine, University of Illinois, the following 33 candidates were presented for the D.V.M. degree:

Leroy Abraham
Benton C. Allen, Jr.
Paul W. Arndt
Ira J. Aves, Jr.
Jack C. Boer
Lawrence G. Clark
Vernon L. Cockerill
Richard D. Coster
John A. Gerdes
Robert C. Graham
Jason E. James
Stanley C. Kadlub
Stephen E. McQuilkin
Joe D. Meller
Delwyn V. Meyer
James R. Meyer
Walter D. Mumme
Walter L. Myers
Eugene H. Nelson
Neal S. Nelson
Delano L. Ohaver
Joan M. Owens
John B. Palenske
William D. Powell
Edwin W. Short
Marshall Van Slingerland
Erwin Small
Peter H. Smith
Lois Stansbury
Jerry R. Steffen
Arnold C. Taft
Gale D. Taylor
Ralph A. Vinson, Jr.

Graduating Class, 1957, College of Veterinary Medicine, University of Illinois

Michigan State College.—At the 1957 commence exercises of the School of Veterinary Medicine, Michigan State University, the following 59 candidates were presented for the D.V.M. degree:

Richard J. Allen
John B. Anderson
Wayne E. Bannink
Donald F. Blake
Oleks Borisenko
Herbert A. Brinkman
Harold P. Brown
Harlan Bullard
Kenneth R. Butcher
James E. Calendar
Arwyn K. Carr
William K. Chambers
George W. Dimmick
David P. DuCharme
John L. Durrer
Robert R. Ewald
William E. Field
Thomas M. Ford
Thomas E. Fritz
Robert F. Going
Donald R. Griswold
Orlin Herrild
James V. Hruska
Kenneth S. Ishimoto
Asa E. Kelley
Kenneth S. Ishimoto
Robert E. Lewis
Roger F. Luneke
Samuel J. McClearen
Alexander M. D. Malcolm
Francis G. McGrady
Albert D. McKee
John W. McKee
William J. McQuillan
Henry J. Meachum
Jack A. Meister
Roger Murray
Robert C. Packer

Peter A. Prescott
Dayton L. Prouty
John H. Richardson
David L. Roberts
Robert C. Russell
Richard R. Sattell
Edward C. Schroeder
Melvin E. Seeliger
Robert L. Shelts
Donald Shoffstall
Gerald W. Snider
Paul H. Snyder
Arnold D. Studer
Joseph Sundell
Susan M. Thompson
John N. Trotman
James L. Turbok
William R. Van Dresser
William A. Van Zytveld
Thomas E. Vice
William R. Voss
Philip Whirledge

Graduating Class, 1957, School of Veterinary Medicine, Michigan State University

Top row (left to right)—Richard J. Allen, John B. Anderson, Wayne E. Bannink, Donald F. Blake, Oleks Borisenko, Herbert A. Brinkman, Harold P. Brown, Harlan Bullard, Kenneth R. Butcher, James E. Calendar, Arwyn K. Carr, William K. Chambers.

Second row—George W. Dimmick, David P. DuCharme, John L. Durrer, Robert R. Ewald, William E. Field, Thomas M. Ford.

Third row—Thomas E. Fritz, Robert F. Going, Donald R. Griswold, Orlin Herrild, James V. Hruska, Kenneth S. Ishimoto, Asa E. Kelley, Robert E. Lewis.

Fourth row—Roger F. Luneke, Samuel J. McClearen, Francis G. McGrady, Albert D. McKee, Dean C. F. Clark, John W. McKee, William J. McQuillan, Alexander M. D. Malcolm, Henry J. Meachum.

Fifth row—Jack A. Meister, Roger Murray, Robert C. Packer, Peter A. Prescott, Dayton L. Prouty, John H. Richardson, David L. Roberts, Robert C. Russell, Richard R. Sattell, Edward C. Schroeder, Melvin E. Seeliger, Robert L. Shelts.

Sixth row—Gerald W. Snider, Paul H. Snyder, Arnold D. Studer, Joseph Sundell, Susan M. Thompson, John N. Trotman, James L. Turbok, William R. Van Dresser, William A. Van Zytveld, Thomas E. Vice, William R. Voss, Philip Whirledge.

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University of Minnesota.—At the 1957 commencement exercises of the College of Veterinary Medicine, University of Minnesota, the following 48 candidates were presented for the D.V.M. degree:

Arthur L. Aronson
Roger A. Asplin
Harold T. Balas
Wayne E. Barcus
Alvin Becker
James L. Bringgold
Richard C. Carlson
Willard F. Carlson
John E. Chase
David K. Chester
Lawrence H. Davis
Ralph E. Day
Paul G. Eischen
Joseph M. Glenn
Charles M. Guthrie
Michael H. Hansen
Elroy D. Hexum
Clinton J. Hof
Stephan Hrenchyshyn
Walter H. Huber
Paul E. Jensen
Burton L. Johnson
Darrel E. Johnson
Alan J. Kenyon
Melvin F. Kirchhoff
Franklin H. Kriewaldt
Delmont D. Lieske
John S. McCallum
David D. Myers
Wendell H. Niemann

Roland C. Olson
Lawrence R. Pederson
Peter E. Poss
Jack W. Register
William A. Roduner
Marvin L. Rohm
Gerald M. Rosen
Robert C. Sartori
Charles G. Schlotthauer
LaVerne M. Schugel
Stanley C. Skadron
Darold L. Strandberg
Ronald E. Werdin
Robert A. Wescott
Willis J. Wesley
Gene Wheeler
Donald A. Witzel
Stuart Wyand

Graduating Class, 1957, College of Veterinary Medicine, University of Minnesota

Top row (left to right)—Arthur L. Aronson, Roger A. Asplin, Harold T. Balas, Wayne E. Barcus, Alvin Becker, James L. Bringgold, Richard C. Carlson, Willard F. Carlson, John E. Chase, David K. Chester, Lawrence H. Davis, Ralph E. Day.

Second row—Paul G. Eischen, Joseph M. Glenn, Charles M. Guthrie, Michael H. Hansen, Elroy D. Hexum, Clinton J. Hof.

Third row—Stephan Hrenchyshyn, Walter H. Huber, Paul E. Jensen, Burton L. Johnson, Darrel E. Johnson, Alan J. Kenyon, Melvin F. Kirchhoff, Franklin H. Kriewaldt.

Fourth row—Delmont D. Lieske, John S. McCallum, David D. Myers, Wendell H. Niemann, Roland C. Olson, Dr. W. T. S. Thorp, Dean, Lawrence R. Pederson, Peter E. Poss, Jack W. Register, William A. Roduner, Marvin L. Rohm.

Fifth row—Gerald M. Rosen, Robert C. Sartori, Charles G. Schlotthauer, LaVerne M. Schugel, Stanley C. Skadron, Darold L. Strandberg, Ronald E. Werdin, Robert A. Wescott, Willis J. Wesley, Gene Wheeler, Donald A. Witzel, Stuart Wyand.

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Ontario Veterinary College.—At the 1957 commencement exercises of the School of Veterinary Medicine, Ontario Veterinary College, the following 45 candidates were presented for the D.V.M. degree:

Reginald M. Applebaum
Derek C. Askey
William H. Bayley
Hubert S. Bennett
James G. Brown
Salvatore R. Carioto
Jean-Paul E. Cucuel
Harry R. Cunliffe
Maurice B. Foster
David W. Francis
Margaret S. Francis
Norman A. Hawkins
Ronald B. Holliday
Leonard I. Hurov
Jeanne V. Ikeda
Eric Johnson
Oswald W. Kelton
Albert B. Kelly
John A. Kessler
Ernst J. Klassen
Antony K. Knirsch
Hans Luyken
George F. Mercier
Edwin B. Misener
Donald S. MacDonald
Sanford A. MacLean
Robert E. McEwen
Donald K. Newton
Leo Niilo
Jan P. Ochalski
Raymond D. O'Connor
Dean H. Percy
Richard B. Philip
Carman S. Redmond
Otto W. Sack
James N. Smart
Brian Sorrell
James G. Steele
Philip A. Taylor
Ronald J. Vallancourt
Gilbert J. Van Der Spank
John G. Walker
Russell A. Willoughby
Walter J. Wolfe
Albert H. Wood

University of Pennsylvania.—At the 1957 commencement exercises of the School of Veterinary Medicine, University of Pennsylvania, the following 45 candidates were presented for the D.V.M. degree:

Wayne M. Akers
Burleigh P. Anderson
George L. Anstadt
Gordon S. Bachman
Morris Barenfus
George E. Boyle
John S. Bush
James Cox
William A. Croasmun
Laurence S. Cushing
Robert J. Day
Richard D. Derstine
Edward H. Devine, Jr.
James F. DeVoe
Virginia L. Eaton
Blair English
Lynn D. Fowler
Lillian A. Giuliani
Stephen G. Hastings
Harvey W. Hayden
Arthur Herring
Howard H. Hine, Jr.
Elaine J. Hopkins
Robert J. Huber
Lea R. Hutchinson
Willard G. Janssen
Charles W. Koenig
Howard O. Lawson
Edward J. Lemos
M. Phyllis Lose
Arthur P. Mayer
Don R. Patton
C. Russell Pryor
Charles L. Putnam
Thomas J. Rogers
Howard Rosenfeld
Allen C. Sayers
Henry R. Schmidt
Roger C. Smith, Jr.
Lawrence R. Soma
William G. Stone
Lawrence S. Toms
William B. Whitlock
Robert E. Wilson
Vernon R. Yingling

• • •

Graduating Class, 1957, School of Veterinary Medicine, Texas A. & M. College

Top row (left to right)—Albert S. Abdullah, Robert N. Allison, Theodore G. Anthony, Charles J. Banta, Jess H. Beal, Joseph L. Blair, Louis F. Boening, Jr., Ray D. Carroll, Delmar R. Cassidy.

Second row—Jack R. Collins, William W. Collins, John E. Cozad, Richard P. Crawford, Jr.

Third row—Charles D. Davis, Billy B. Dunn, Edwin H. Ellison, James L. Forgason, Jack L. Fowler, Ronald C. Francis, Thomas J. Galvin, Frederick J. Hander.

Fourth row—Wendell E. Harding, Howard H. Hargroder, Carl D. Heather, Harvey T. Helms, Joe B. Jackson, Alson R. Kennedy, Jr., William H. Kirksey, Wallace L. Kleb, George F. Luquette.

Fifth row—M. D. McWilliams, Robert Miller, John E. Oliver, Jr., Reno P. Petry, Jr., Kenneth R. Pierce, John E. Redden, William A. Roach, Charles S. Saxe, Aubrey L. Smith.

Sixth row—James R. Starnater, B. K. Strickland, Robert C. Templeton, Gerald L. Van Hoosier, Jr., Willis K. Webb, Carl P. Weidenbach, Clifford S. Whitmore, Billy R. Williams, Eugene H. Williams.

Texas A.&M. College.—At the 1957 commencement exercises of the College of Veterinary Medicine, Texas A.&M. College, the following 48 candidates were presented for the D.V.M. degree:

Albert S. Abdullah
Robert N. Allison
Theodore G. Anthony
Charles J. Banta
Jess H. Beal
Joseph L. Blair
Louis F. Boening, Jr.
Ray D. Carroll
Delmar R. Cassidy
Jack R. Collins
William W. Collins
John E. Cozad
Richard P. Crawford, Jr.
Charles D. Davis
Billy B. Dunn
Edwin H. Ellison
James L. Forgason
Jack L. Fowler
Ronald C. Francis
Thomas J. Galvin
Frederick J. Hander
Wendell E. Harding
Howard H. Hargroder
Carl D. Heather
Harvey T. Helms
Joe B. Jackson
Alson R. Kennedy, Jr.
William H. Kirksey
Wallace L. Kleb
George F. Luquette
M. D. McWilliams
Robert Miller
John E. Oliver, Jr.
Reno P. Petry, Jr.
Kenneth R. Pierce
John E. Redden
William A. Roach
Charles S. Saxe
Aubrey L. Smith
James R. Starnater
B. K. Strickland
Robert C. Templeton
Gerald L. VanHoosier, Jr.
Willis K. Webb
Carl P. Weidenbach
Clifford S. Whitmore
Billy R. Williams
Eugene H. Williams

DEATHS

Star indicates member of AVMA

★ **Thomas A. Sigler** (IND '02), 78, prominent veterinarian of Greencastle, Ind., and a past-president of the AVMA, died on June 24, 1957, at Putnam County Hospital where he had been a patient for the past few months.

Dr. Thomas A. Sigler

Born in Clinton township, Sept. 15, 1879, of pioneer parents, Dr. Sigler spent his early years on the farm and, due to his love of animals, became interested in the veterinary profession. After graduation from Indiana Veterinary College, he taught there for a time and also at the Terre Haute school in addition to conducting a general practice, first from the home farm and later from Greencastle where he opened an office in 1904.

He continued to study, kept well-informed on veterinary medical developments, and was a much sought-after lecturer and demonstrator at state association meetings, conferences, and clinics where his intensely practical ideas and methods were eagerly listened to.

Dr. Sigler was also active in civic affairs and served on various boards and committees. He was president of the Indiana V.M.A. in 1911-1912, the AVMA in 1926-1927, an honorary member of the Mississippi and Louisiana state associations and of Alpha Psi fraternity. He also contributed a number of articles to veterinary medical publications.

He is survived by his widow, the former Florence H. Hughes of Greencastle, one sister, several nieces and nephews, and a number of cousins. Interment was in Forest Hill Cemetery.

Harry L. Brown (CVC '11), 76, Onarga, Ill., died May 30, 1957, after an illness of one week. Dr. Brown was a general practitioner. He is survived by his widow, one son, and one daughter.

★**Chester F. Clark** (MSU '29), 57, dean of the College of Veterinary Medicine at Michigan State University, died July 28, 1957, shortly before he was to retire and become dean emeritus, because of ill health. A more complete obituary will appear in the next issue.

★**John T. E. Dinwoodie** (UP '13), 69, Billings, Mont., died June 3, 1957. Dr. Dinwoodie was with the ARS, U.S. Department of Agriculture. He was a member of the AVMA. Survivors include his widow and two daughters.

★**Charles S. Hayward** (ONT '02), 88, Mattoon, Ill., died June 21, 1957. Dr. Hayward was a general practitioner and a member of the AVMA.

Carl H. Hofstrand (UP '13), 66, Leeds, N. Dak., died June 10, 1957, after contracting tetanus from a puncture injury suffered while working with cattle. Dr. Hofstrand was prominent in civic affairs and had been a member of the AVMA. His widow, one son, and one daughter survive.

Earl F. Johnson (OSU '34), 49, Prospect, Ohio, died May 29, 1957, after a heart attack. Dr. Johnson served four years with the Air Force during World War II.

V. C. Pauhlman (WSC '15), 64, Prosser, Wash., died May 20, 1957. Dr. Pauhlman had served as a field veterinarian with the Washington State Department of Agriculture. He had been a member of the AVMA. Dr. Pauhlman is survived by his widow.

★**Clarence M. Penticuff, Jr.** (KSC '43), 36, Minneapolis, Minn., died April 5, 1957, after being shot by a kennelman who went berserk. Dr. Penticuff served in World War II. He was a member of the AVMA. His widow, one son, and one daughter survive.

★**Harry B. Roshon** (UP '15), 69, Reading, Pa., died recently. Dr. Roshon was retired. He was a member of the AVMA.

Charles F. Runnels (OSU '30), 61, St. Clairsville, Ohio, died May 17, 1957. Dr. Runnels operated a small animal hospital in St. Clairsville and another in Martins Ferry. Survivors include his widow, a daughter, a stepdaughter, and his father.

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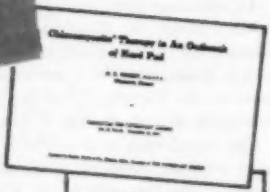
by James E. Cook, D.V.M.

Reprint, *The North American Veterinarian*



CHLOROMYCETIN THERAPY IN AN OUTBREAK OF HARD PAD

by M. B. Toosey, M.R.C.V.S.

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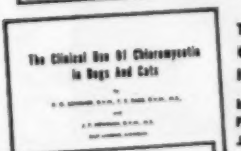

THE CLINICAL USE OF CHLOROMYCETIN IN DOGS AND CATS

by R. G. Schirmer, D.V.M., F. E. Eads, D.V.M., M.S., and J. P. Newman, D.V.M., M.S.

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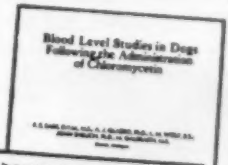

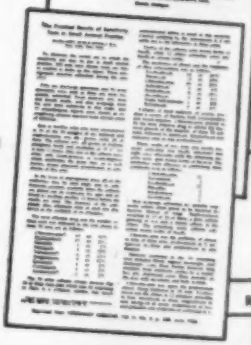

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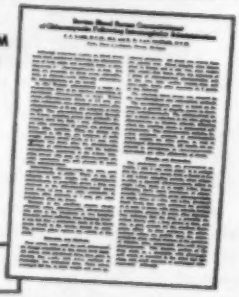

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by F. E. Eads, D.V.M., M.S. and K. D. Van Hocker, D.V.M.

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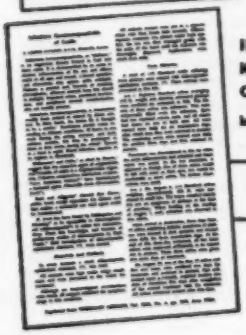

INFECTIOUS KERATOCONJUNCTIVITIS OF CATTLE

by S. Lester Jackson, D.V.M.

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VETERINARY DEPARTMENT

PARKE, DAVIS & COMPANY

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Drs. J. A. Henderson and M. G. Fincher Elected to Executive Board in Districts I and IX

DISTRICT I (CANADA)

In balloting completed July 10, 1957, in District I, Dr. James A. Henderson, Guelph, Ont., was elected for a five-year term, succeeding Dr. T. Lloyd Jones who will have completed a similar term at the Cleveland meeting and who served as Executive Board chairman this past year.

Dr. Henderson is a graduate of Ontario Veterinary College, class of 1936, and is professor and head of the Department of Medicine and Surgery there, a position he has held for several years. He is well known both in this country and abroad for his research in dairy cattle diseases and as a pioneer in artificial insemination work, including the establishment of the first AI breeding unit in North America.

Dr. James A. Henderson

In addition to his work here, Dr. Henderson, while in military service with the Royal Canadian Air Force in Great Britain during World War II, assisted in developing an AI program in that country. His abilities in the research and clinical aspects of reproductive diseases of dairy cattle, and in AI work, led to his chairmanship of the AVMA special committee on these subject problems in 1953-1954. In 1953, he was secretary of the Section on Surgery and Obstetrics and was chairman in 1954. He has also been a frequent contributor to AVMA and other veterinary medical association programs.

DISTRICT IX (NEW YORK STATE AND NEW ENGLAND STATES)

In this District, Dr. Myron G. Fincher, Ithaca, N. Y., was elected to a five-year term suceeding Dr. Edwin Laitinen, West Hartford, Conn., who will have served a total of 12 years on the Executive Board, including two part-terms and one full term and as chairman of the Board from 1952 to 1954.

Dr. Myron G. Fincher

Dr. Fincher is a graduate of New York State Veterinary College at Cornell University, class of 1920, and is well known for his work on dairy cattle diseases. He joined the veterinary faculty at Cornell following graduation. In 1942, he was made assistant professor in the Department of Medicine and Obstetrics and director of the ambulatory clinic.

In 1926-1927, Dr. Fincher was on leave of absence when he served as veterinarian in charge of breeding operations on two Thoroughbred farms in Kentucky. Later, during a sabbatical leave, he was acting professor of medicine at the Ohio State University veterinary college. He has written many papers and reports on the clinical aspects of dairy cattle diseases, a field which has been his principal interest, including an organized mastitis control program in New York State which he directed for some time. For these and other research contributions to dairy cattle disease control, he was the 1954 recipient of the Borden Award administered by the AVMA.

Drs. Henderson and Fincher will take office at the conclusion of the annual Executive Board sessions in Cleveland.

Drs. E. R. Maschgan and Jo Anne Schmidt of Chicago served as tellers on July 12 and certified the foregoing results of the elections in the two districts.

STUDENT CHAPTER ACTIVITIES

Texas Chapter.—During the spring semester, members of the Texas A. &. M. Student Chapter of the AVMA heard the following speakers: on Feb. 12, Dr. Paul Junkerman, "Gadgets and Helpful Hints"; Feb. 26, Col. Harry A. Gorman, "Prostheses for Canine and Feline Hips"; March 12, Dr. A. C. Sears, "Planning a Small Animal Hospital"; March 18, Dr. Frank Kral, "Dermatoses of Small Animals"; April 23, Mr. Phil Covene, "Setting up and Managing a Practice"; May 6, Gen. Wayne O. Kester, "Organized Veterinary Medicine." The awards were presented at the May 21 meeting.

Officers for the fall semester, 1957, are: J. D. McCrady, president-elect; Joe D. Ross, vice-president; Hughes McCrary, secretary-treasurer; Gene Cope, reporter; Bobby J. Gross, parliamentarian; Bernie James, sergeant-at-arms. The faculty sponsors are Drs. R. D. Turk and G. S. Trevino.

s/HUGHES MCCRARY, *Secretary.*

APPLICATIONS

Applicants—Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative Bylaws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., the names of applicants residing within the jurisdictional limits of the constituent associations shall be published once in the JOURNAL.

The following applicants have been certified as members of the constituent association that has jurisdiction over the area in which the applicant resides. This certification was made by the secretary of the constituent association in accordance with Section 2, Article X, of the Administrative Bylaws.

ARMSTRONG, JOHN S.
1212 Robin Hood Circle, Baltimore, Md.
D.V.M., Ontario Veterinary College, 1949.

BANKER, CHARLES A.
Box 869, Rosenberg, Texas.
D.V.M., Texas A & M College, 1949.

BRUCE, THOMAS B., II
422 So. Blount St., Raleigh, N. Car.
D.V.M., Alabama Polytechnic Institute, 1936.

FLAXMAN, SIDNEY H.
111 W. Ridge Pike, Conshohocken, Pa.
V.M.D., University of Pennsylvania, 1952.

HELOUIN, MARTIN C.
2533 North Blvd., Baton Rouge, La.
D.V.M., Alabama Polytechnic Institute, 1948.

MITCHELL, HOWARD H.
302 E. 7th St., Cozad, Neb.
D.V.M., Colorado A. & M. College, 1940.

NEHMER, E. O.
Campbellsport, Wis.
D.V.M., Iowa State College, 1942.

STEWART, JAMES A. B.
1207 Stevenson Lane, Towson, Md.
D.V.M., Ontario Veterinary College, 1936.

Graduate Applicants

The following are graduates who have recently received their veterinary degree and who have applied for AVMA membership under the provision granted in the Administrative Bylaws to members in good standing of student chapters. Applications from this year's senior classes not received in time for listing this month will appear in later issues. An asterisk (*) after the name of a school indicates that all of this year's graduates have made application for membership.

First Listing

University of California

GALBREATH, DAVID A., D.V.M.
601 E. "I" St., Benicia, Calif.
Vouchers: C. T. Robinson and A. C. Asbury.

GOULD, THOMAS A., D.V.M.
167 Murray St., Chula Vista, Calif.
Vouchers: G. D. Pettit and J. P. Hughes.

HUR, DONALD E., D.V.M.
1511 5th St., Glendale, Calif.
Vouchers: C. T. Robinson and J. D. Wheat.

JOHNSTONE HUBERT C., D.V.M.
7267 Pacific View Dr., Los Angeles, Calif.
Vouchers: J. C. Moulton and G. D. Pettit.

LINDSTROM, ROBERT A., D.V.M.
1234 N. Wilson Way, Stockton, Calif.
Vouchers: J. F. Christensen and G. D. Pettit.

PRIESTER, WILLIAM A., JR., D.V.M.
215 Lombardy Lane, Lemoore, Calif.
Vouchers: A. C. Asbury and G. H. Theilen.

WEST, ERIC J. D., D.V.M.
P.O. Box 633, Davis, Calif.
Vouchers: G. H. Theilen and G. D. Pettit.

University of Georgia

FOSTER, DENNIS G., D.V.M.
3211 The Alameda, Baltimore, Md.
Vouchers: J. D. Morton and A. L. Kleckner.

VILDIBILL, HARRY D., D.V.M.
930 Beltline Blvd., Columbia, S. Car.
Vouchers: M. Rohleder and D. Sikes.

University of Illinois

MC QUILKIN, STEPHEN E., D.V.M.
Beecher, Ill.
Vouchers: L. E. Boley and A. B. Pletsch.

MEYER, DELWYN V., D.V.M.
227 Hollis St., Kewanee, Ill.
Vouchers: L. E. Boley and R. D. Hatch.

SHORT, EDWIN W., D.V.M.
R.R. 3, David Lane, Pleasure Ridge Park, Ky.
Vouchers: D. J. Sullivan and J. O. Alberts.

Michigan State University

ALLEN, RICHARD J., D.V.M.
R.R. 1, Ithaca, Mich.
Vouchers: M. P. Rines and S. C. Schmittle.

BANNINK, WAYNE E., D.V.M.
Sparta, Mich.
Vouchers: G. J. Heyt and R. G. Schirmer.

BLAKE, DONALD F., D.V.M.
2nd and Cutler Sts., Chippewa Lake, Mich.
Vouchers: W. O. Brinker and R. D. Barner.

BORISENKO, OLEKS, D.V.M.
20563 Syracuse, Detroit, Mich.
Vouchers: N. R. Cholvin and R. D. Barner.

BRINKMAN, HERBERT A., D.V.M.
R.R. 1, Caro, Mich.
Vouchers: G. H. Conner and R. D. Barner.

BROWN, HAROLD P., Jr., D.V.M.
Bridge St., Richmond, Vt.
Vouchers: M. P. Rines and R. G. Schirmer.

BUTCHER, KENNETH R., D.V.M.
Hart, Mich.
Vouchers: R. F. Johnston and R. D. Barner.

CALENDER, JAMES E., D.V.M.
807 Birch Rd., East Lansing, Mich.
Vouchers: W. D. Brinker and D. J. Ellis.

CARR, ARWYN K., D.V.M.
R.R. 3, Nixon Rd., Charlotte, Mich.
Vouchers: L. B. Sholl and R. G. Schirmer.

CHAMBERS, WILLIAM K., D.V.M.
Box 677, Mackinac Island, Mich.
Vouchers: C. C. Beck and D. J. Ellis.
DIMMICK, GEORGE W., D.V.M.
Portland, Ind.
Vouchers: G. R. Moore and W. D. Brinker.
DUCHARME, DAVID P., D.V.M.
2554 W. Fond Du Lac, Milwaukee, Wis.
Vouchers: R. G. Schirmer and W. O. Brinker.
DURRER, JOHN L., D.V.M.
1645 W. 8th St., Anderson, Ind.
Vouchers: R. G. Schirmer and C. C. Beck.
FIELD, WILLIAM E., D.V.M.
Virginia Agricultural Experimental Station, Animal Pathology Laboratory, Blacksburg, Va.
Vouchers: R. G. Schirmer and R. D. Barner.
FORD, THOMAS M., D.V.M.
60 Maryland Dr., Battle Creek, Mich.
Vouchers: R. D. Barner and A. O. Broome.
FRITZ, THOMAS E., D.V.M.
3945 N. Maryland Ave., Milwaukee, Wis.
Vouchers: E. K. Sales and R. D. Barner.
GOING, ROBERT F., D.V.M.
731 Hinman Ave., Evanston, Ill.
Vouchers: N. R. Cholvin and R. D. Barner.
GRISWOLD, DONALD R., D.V.M.
25 Clover St., Kent City, Mich.
Vouchers: G. H. Conner and N. R. Cholvin.
HERRILD, ORLIN, D.V.M.
Hwy. M-35, Menominee, Mich.
Vouchers: M. P. Rines and R. G. Schirmer.
HRUSKA, JAMES V., D.V.M.
700 N. Cass Lake Rd., Pontiac, Mich.
Vouchers: C. F. Cairy and R. D. Barner.
ISHIMOTO, KENNETH S., D.V.M.
1704 10th Ave., Honolulu, Hawaii.
Vouchers: R. G. Schirmer and M. P. Rines.
KELLEY, ASA E., D.V.M.
c/o Dr. E. G. Boydston, Hudson, Mich.
Vouchers: W. O. Brinke and G. R. Moore.
LEWIS, ROBERT E., D.V.M.
Department of Veterinary Science, Purdue University, Lafayette, Ind.
Vouchers: R. D. Barner and R. G. Schirmer.
LUNEKE, ROGER F., D.V.M.
400 N. Antler St., Gladwin, Mich.
Vouchers: W. D. Brinker and G. R. Moore.
MALCOLM, ALEX M. D., D.V.M.
902-B Maple Lane, East Lansing, Mich.
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MCCLEAREN, SAMUEL J., D.V.M.
14135 Racho, Wyandotte, Mich.
Vouchers: R. G. Schirmer and D. J. Ellis.
MCGRADY, FRANCIS G., D.V.M.
Veterinary Clinic, Veedersburg, Ind.
Vouchers: D. J. Ellis and R. D. Barner.
MCKEE, ALBERT D., D.V.M.
Cory Lane, Bloomington Animal Hospital, Bloomington, Ill.
Vouchers: G. H. Conner and W. O. Brinker.
MCKEE, JOHN W., D.V.M.
Brownsburg, Ind.
Vouchers: N. R. Cholvin and R. D. Barner.
MCQUILLAN, WILLIAM J., D.V.M.
8208 Carnegie Ave., Cleveland, Ohio.
Vouchers: N. R. Cholvin and R. G. Schirmer.
MEACHUM, HENRY J., III., D.V.M.
420 E. Main, Hartford, Mich.
Vouchers: L. B. Sholl and W. O. Brinker.
MEISTER, JACK A., D.V.M.
176 Paddock Ave., Meriden, Conn.
Vouchers: W. F. Riley, Jr., and W. O. Brinker.
PACKER, ROBERT C., D.V.M.
406 N. Munroe, Lowell, Mich.
Vouchers: D. J. Ellis and N. R. Cholvin.
PRESCOTT, PETER A., D.V.M.
1349 Ford Rd., Cleveland, Ohio.
Vouchers: W. O. Brinker and R. G. Schirmer.
PROUTY, DAYTON L., Jr., D.V.M.
469 Main St., Belleville, Mich.
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RICHARDSON, JOHN H., D.V.M.
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ROBERTS, DAVID L., D.V.M.
U.S. Hwy. 31, Petoskey, Mich.
Vouchers: R. F. Johnston and E. K. Sales.
RUSSELL, ROBERT C., D.V.M.
Berwyn Animal Hospital, 2823 S. Harlem Ave., Berwyn, Ill.
Vouchers: W. O. Brinker and G. R. Moore.
SATTELL, RICHARD R., D.V.M.
3232 W. Central Ave., Milwaukee, Wis.
Vouchers: G. R. Moore and G. H. Conner.
SEELIGER, MELVIN E., D.V.M.
Princeton, Wis.
Vouchers: G. H. Conner and W. O. Brinker.
SHOFFSTALL, DONALD, D.V.M.
76 Chestnut St., Maplewood, N. J.
Vouchers: E. K. Sales and W. F. Riley, Jr.
SNIDER, GERALD W., D.V.M.
P.O. Box 85, Milford, Ind.
Vouchers: G. R. Moore and M. P. Rines.
SNYDER, PAUL H., D.V.M.
407½ N. State, Big Rapids, Mich.
Vouchers: G. R. Moore and W. F. Riley, Jr.
STUDER, ARNOLD D., D.V.M.
Box 25, c/o Dr. H. Wolford, West Grove, Penn.
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SUNDELL, JOSEPH, D.V.M.
929 Bauman, Royal Oak, Mich.
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THOMPSON, SUSAN M., D.V.M.
35 Miller St., Mount Clemens, Mich.
Vouchers: R. G. Schirmer and R. D. Barner.
TROTMAN, JOHN N., D.V.M.
Rt. 1, Box 200, De Funiak Springs, Fla.
Vouchers: W. O. Brinker and N. R. Cholvin.
TURBOK, JAMES L., D.V.M.
Deckerville, Mich.
Vouchers: G. R. Moore and M. P. Rines.
VAN DRESSER, WILLIAM R., D.V.M.
1044 Harvard Rd., Grosse Pointe, Mich.
Vouchers: M. P. Rines and G. R. Moore.
VAN ZYTVELD, WILLIAM A., D.V.M.
1040 Dallas Ave., S.E., Grand Rapids, Mich.
Vouchers: R. G. Schirmer and N. W. Cholvin.
VICE, THOMAS E., D.V.M.
3319 E. State St., Fort Wayne, Ind.
Vouchers: D. D. Piermattei and R. G. Schirmer.
VOSS, WILLIAM R., D.V.M.
426 Hunter St., Battle Creek, Mich.
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Oklahoma A. & M. College

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c/o Post Office, Cramerton, N. Car.
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838 S. Dinwiddie St., Arlington, Va.
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100 Harvard Rd., Harvertown, Pa.
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MEYER, DELWYN V., D.V.M.
227 Sollis St., Kewanee, Ill.
Vouchers: L. E. Boley and R. D. Hatch.
PRYOR, CHARLES R., V.M.D.
104 N. Broad St., Waynesboro, Pa.
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4946 Buffalo Rd., Erie, Pa.
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R.F.D. 4, Box 555-R, New Brunswick, N. J.
Vouchers: L. Krawitz and R. C. Snyder.
SAYERS, ALLEN C., V.M.D.
39th St. and Woodland Ave., Philadelphia, Pa.
Vouchers: J. H. Mark and C. W. Raker.
SHORT, EDWIN W., D.V.M.
R.R. 3, David Lane, Pleasure Ridge Park, Ky.
Vouchers: D. J. Sullivan and J. O. Alberts.
SMITH, ROGER G., JR., V.M.D.
128 E. Hamilton Ave., State College, Pa.
Vouchers: J. F. Hokanson and A. J. Luedke.
YINGLING, VERNON R., V.M.D.
3076 Earlsmere Ave., Pittsburgh, Pa.
Vouchers: W. H. Rhodes and J. H. Mark.

Texas A. & M. College

BANTA, CHARLES J., D.V.M.
3124 Wisconsin St., Baytown, Texas.
Vouchers: R. D. Turk and R. J. Beamer.
CASSIDY, DELMAR R., D.V.M.
Department of Veterinary Microbiology, School of Veterinary Medicine, College Station, Texas.
Vouchers: L. C. Grumbles and A. I. Flowers.
ELLISON, EDWIN H., D.V.M.
712 S. Green, Longview, Texas.
Vouchers: G. S. Trevino and R. J. Beamer.
HARGRODER, HOWARD H., D.V.M.
Church Point, La.
Vouchers: H. A. Burton and P. Amy.
MC WILLIAMS MENZIES D., D.V.M.
Box 297, Junction, Texas.
Vouchers: R. J. Beamer and W. M. Romane.
OLIVER, JOHN E., JR., D.V.M.
Department of Veterinary Clinics and Surgery, Colorado State University, Fort Collins, Colo.
Vouchers: J. P. Davis and G. S. Trevino.
ROACH, WILLIAM A., D.V.M.
Shady Lane Trailer Park, Killeen, Texas.
Vouchers: R. J. Beamer and J. P. Davis.
SAXE, CHARLES S., D.V.M.
6510th U.S.A.F. Hospital, Edwards AFB., Calif.
Vouchers: W. M. Romane and P. L. Hubert.
STARNATER, JAMES R., D.V.M.
309 Hillside, Richardson, Texas.
Vouchers: H. F. Dieterich and R. C. Mallett.
VAN HOOSIER, GERALD L., JR., D.V.M.
1004 S. Brazos St., Weatherford, Texas.
Vouchers: R. J. Beamer and G. S. Trevino.
WEBB, WILLIS K., D.V.M.
903 N. High St., Winchester, Tenn.
Vouchers: C. H. Bridges and H. A. Smith.

Tuskegee Institute

BELLE, JOSEPH L., D.V.M.
3601 Oak Ave., Miami, Fla.
Vouchers: G. W. Cooper and E. Braye.
ARTHUR, EDWARD C., D.V.M.
1311 N. Frazier St., Philadelphia, Pa.
Vouchers: R. T. Gross, Jr., and G. W. Cooper.

Schering Appoints Dr. Cronin To Head New Department

Dr. Michael T. Cronin has been named manager of the newly formed department of Toxicology and Pathology in the research laboratories of Schering Corporation, Bloomfield, N. J., according to Mr. Robert E. Waterman, vice-president of the company.

Dr. Michael T. Cronin

Dr. Cronin was formerly associate pathologist at Penrose Research Laboratories, Philadelphia, and assistant professor of veterinary pathology at the University of Pennsylvania. Receiving an M.R.C.V.S. degree from the Veterinary College of Ireland, Dublin, in 1945, he came to the United States in 1952. Dr. Cronin is certified by the American College of Veterinary Pathologists and is a member of the AVMA.

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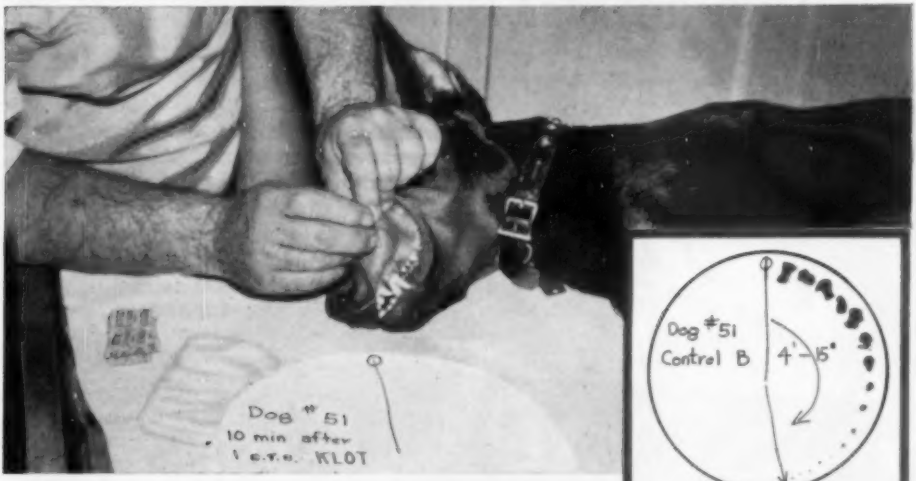

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McEachran, D.: Am. Vet. Rev. 2:108 (Jan.) 1879.

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Dissolve 2 BLUCO tablets in each gallon of drinking water, and allow no other water. Continue treatment 7 days for complete recovery; otherwise, disease may re-occur. Precede treatment with flush (about 6 hours, preferably in the morning).

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COMING MEETINGS

American Association of Veterinary Bacteriologists. Annual meeting. Ohio State University, Columbus, Ohio, August 16, and the Ohio Agricultural Experiment Station, Wooster, Aug. 17, 1957. C. H. Cunningham, College of Veterinary Medicine, Michigan State University, East Lansing, secretary.

American Veterinary Medical Association. Annual meeting. Cleveland Auditorium, Cleveland, Ohio, Aug. 19-22, 1957. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

Louisiana State Veterinary Medical Association. Annual meeting. Jung Hotel, New Orleans, Aug. 28-29, 1957. H. C. Melius, 101 Metairie Rd., Metairie, program chairman.

New Mexico Veterinary Medical Association. Annual meeting. Albuquerque, Sept. 9-10, 1957. William E. Kraus, 3018 Rio Grande Blvd., N.W., Albuquerque, president.

Washington State Veterinary Medical Association. Annual meeting. Monticello Hotel, Longview, Sept. 9-10, 1957. William F. Harris, 1102 E. Main St., Puyallup, Wash., secretary.

New York State Veterinary Medical Society. Annual meeting. Hotel Statler, Buffalo, Sept. 11-13, 1957. Joan S. Halat, 803 Varick St., Utica, secretary.

Northern Illinois Veterinary Medical Association. Fall meeting. Rockford, Sept. 18, 1957. J. G. Hardenbergh, 121 Bridge Street, Rockton, Ill., secretary-treasurer.

South Dakota Veterinary Medical Association. Annual convention, Hotel Cataract, Sioux Falls, Sept. 19-20, 1957. J. L. Noorday, Marion, S. Dak., secretary.

District of Columbia Veterinary Medical Association. Third annual all-day meeting. Sternberg Auditorium, Walter Reed Army Medical Center, Oct. 1, 1957. Wm. I. Gay, 5200 Chandler St., Bethesda 14, Md., secretary.

New England Veterinary Medical Association. Annual meeting. Equinox House, Manchester, Vt., Oct. 6-9, 1957. C. Lawrence Blakely, 180 Longwood Ave., Boston, Mass., secretary.

Purdue University. Annual short course for veterinarians. Purdue University, West Lafayette, Ind., Oct. 9-11, 1957. L. M. Hutchings, secretary.

Florida State Veterinary Medical Association. Annual meeting. Fort Harrison Hotel, Clearwater, Oct. 13-15, 1957. Robert P. Knowles, 2101 N.W. 25th Ave., Miami 42, Fla., secretary.

University of Missouri. Annual short course for graduate veterinarians, Oct. 14-15, 1957, School of Veterinary Medicine, University of Missouri, Columbia. Cecil Elder, chairman.

Pennsylvania State Veterinary Medical Association. Annual meeting. Hotel Brunswick, Lancaster, Oct. 16-18, 1957, Raymond C. Snyder, N. W. Corner Walnut St. and Copley Rd., Upper Darby, secretary.

Texas Veterinary Medical Association. Annual meeting. Baker Hotel, Dallas, Oct. 16-18, 1957. Paul B. Blunt, 712 Maverick Bldg., San Antonio, Texas, secretary.

Eastern Iowa Veterinary Association. Annual meeting. Hotel Sheraton-Montrose, Cedar Rapids, Oct. 17-18, 1957. F. E. Brutsman, Traer, Iowa, secretary.

Illinois, University of. Annual veterinary conference and short course. School of Veterinary Medicine, University of Illinois, Urbana, Oct. 17-18, 1957. L. E. Boley, chairman.

Southern Veterinary Medical Association. Annual meeting.

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*Complete literature, with clinical data, available on request.

●SELEEN—SELENIUM SULFIDE, ABBOTT.

Hotel Roanoke, Roanoke, Va., Oct. 27-30, 1957. A. A. Husman, P. O. Box 91, Raleigh, N. Car., secretary.

Cornell University. Nutrition conference. Cornell University, Ithaca, N.Y., Oct. 31-Nov. 1, 1957. J. K. Loosli, Stocking Hall, Cornell University, Ithaca, N.Y., chairman.

Animal Care Panel. Annual meeting. Bellevue Hotel, San Francisco, Calif., Nov. 7-9, 1957. R. J. Flynn, Box 299, Lemont, Ill.

Pennsylvania, University of. Annual conference for veterinarians. School of Veterinary Medicine, Philadelphia, Jan. 7-8, 1958. M. W. Allam, dean.

Cornell University. Annual conference for veterinarians. New York State Veterinary College, Ithaca, Jan. 8-10, 1958. W. A. Hagan, dean.

Kansas Veterinary Medical Association. Annual convention. Hotel Broadview, Wichita, Jan. 12-14, 1958. K. Maynard Curts, 5236 Delmar Ave., Kansas City 3, Kan., secretary.

Intermountain Veterinary Medical Association. Annual meeting. Hotel Utah, Salt Lake City, Jan. 16-18, 1958. R. A. Bagley, 4600 Creek View Dr., Murray, Utah, secretary.

Minnesota Veterinary Medical Association. Annual meeting, St. Paul, Jan. 20-22, 1958. B. S. Pomeroy, School of Veterinary Medicine, University of Minnesota, St. Paul 1, Minn.

North Carolina State College. Conference for veterinarians. North Carolina State College, Raleigh, Jan. 28-31, 1958. C. D. Grinnells, chairman.

Oregon Veterinary Medical Association. Winter meeting. Portland, Jan. 31-Feb. 1, 1958. Edward L. Holden, P. O. Box 445, Oswego, secretary.

Foreign Meetings

British Veterinary Association, Annual congress. University of Cambridge, Cambridge, England, Aug. 25-31, 1957. Mr. F. Knight, 7, Mansfield St., Portland Place, London, W, 1, general secretary.

Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Association, the first Thursday of each month. B. M. Lauderdale, Montgomery, secretary.

Jefferson County Veterinary Medical Association, the second Thursday of each month. S. A. Price, 213 N. 15th St., Birmingham, secretary.

Mobile-Baldwin Veterinary Medical Association, the third Tuesday of each month. W. David Gross, 771 Holcombe Ave., Mobile, Ala., secretary.

ARIZONA—Central Arizona Veterinary Medical Association, the second Tuesday of each month. Keith T. Maddy, Phoenix, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. E. T. Anderson, Rt. 2, Box 697, Tucson, Ariz., secretary.

CALIFORNIA—Alameda Contra Costa Veterinary Medical Association, last Wednesday of each month. Leo Goldson, 3793 Broadway, Oakland 11, Calif., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of each month. Maurice L. Boevers, 3394 Mt. Diablo Blvd., Lafayette, Calif., secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. R. B. Barsaleau, 2333 E. Mineral King, Visalia, Calif., secretary.

Kern County Veterinary Medical Association, the first Thursday evening of each month. A. L. Irwin, 301 Taft Highway, Bakersfield, Calif., secretary.

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. W. H. Rockey, P. O. Box 121, San Luis Obispo, Calif., secretary.

Monterey Bay Area Veterinary Medical Association, the

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third Wednesday of each month. Lewis J. Campbell, 90 Corral de Tierra, Salinas, Calif., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell, in Modesto, Calif. Lyle A. Baker, Turlock, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month. Chester A. Maeda, 766 E. Highland Ave., San Bernardino, Calif., secretary.

Orange County Veterinary Medical Association, the third Thursday of each month. Donald E. Lind, 2643 N. Main St., Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. R. C. Lawson, 4040 El Camino, Palo Alto, Calif., secretary.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. Robert E. Clark, Napa, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. W. E. Steinmetz, 4227 Freeport Blvd., Sacramento, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. H. R. Rossoll, 1795 Moore St., San Diego, Calif., secretary.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at the Casa Escobar Restaurant in Studio City. John Chudacoff, 7912 Sepulveda Blvd., Van Nuys, secretary.

Santa Clara Valley Veterinary Association, the fourth Tuesday of each month. Kay Beulley, N. Fourth and Gish Rd., San Jose, Calif., secretary.

Southern California Veterinary Medical Association, the last Wednesday of each month. Don Mahan, 1919 Wilshire Blvd., Los Angeles 57, Calif., executive secretary.

Tulare County Veterinarians, the second Thursday of each month. R. B. Barsaleau, 2333 E. Mineral King, Visalia, Calif., secretary.

COLORADO—Denver Area Veterinary Society, the fourth Tuesday of every month. Richard C. Tolley, 5060 S. Broadway St., Englewood, Colo., secretary.

Northern Colorado Veterinary Medical Society, the first Monday of each month. M. A. Hammarlund, School of Veterinary Medicine, Colorado A. & M. College, Fort Collins, Colo., secretary.

DELAWARE—New Castle County Veterinary Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. E. J. Hathaway, Clifton Park Manor, Apt. 73-5, Wilmington 2, Del., secretary.

FLORIDA—Central Florida Veterinary Medical Association, the first Tuesday of each month, time and place specified monthly. Jack H. McElyer, 5925 Edgewater Drive, Orlando, Fla., secretary.

Jacksonville Veterinary Medical Association, the first Thursday of every month. Dodsons Restaurant. P. S. Roy, 4443 Atlantic Blvd., Jacksonville, Fla., secretary.

Northwest Florida Veterinary Medical Society, third Wednesday of each month, time and place specified monthly. T. R. Geci, 108B Catherine Ave., Pensacola, Fla., secretary.

Palm Beach Veterinary Society, the last Thursday of each month in the county office building at 810 Datura St., West Palm Beach. J. J. McCarthy, 500-25th Street, West Palm Beach, Fla., secretary.

Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. Paul J. Myers, Winter Haven, Fla., secretary.

South Florida Veterinary Society, the third Wednesday of each month. Time and place specified monthly. Frank Mueller, Jr., 4148 E. 8th Ave., Hialeah, Fla., secretary.

Suwannee Valley Veterinary Association, the fourth Tuesday of each month, Hotel Thomas, Gainesville. W. B. Martin, Jr., 3002 N. W. 6th St., Gainesville, Fla., secretary.

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Volusia County Veterinary Medical Association, the fourth Thursday of each month. A. E. Hixon, 131 Mary St., Daytona Beach, Fla., secretary.

GEORGIA—Atlanta Veterinary Society, the second Tuesday of every month at the Elks Home on Peachtree St., Atlanta, Ga. J. L. Christopher, Smyrna, Ga., secretary.

ILLINOIS—Chicago Veterinary Medical Association, the second Tuesday of each month. Mark E. Davenport, Jr., 215 S. Edgewood Ave., LaGrange, Ill., secretary.

Eastern Illinois Veterinary Medical Association, the first Thursday of March, June, September, and December. A one-day clinic is held in May. H. S. Bryan, College of Veterinary Medicine, University of Illinois, Urbana, secretary.

INDIANA—Central Indiana Veterinary Medical Association, the second Wednesday of each month. Peter Johnson, Jr., 4410 N. Keystone Ave., Indianapolis 5, secretary.

Michiana Veterinary Medical Association, the second Thursday of every month except July and December, at the Hotel LaSalle, South Bend, Ind. J. M. Carter, 3421 S. Main St., Elkhart, Ind., secretary.

Tenth District Veterinary Medical Association, the third Thursday of each month. J. S. Baker, P. O. Box 52, Pendleton, Ind., secretary.

IOWA—Cedar Valley Veterinary Association, the second Monday of each month, except January, July, August, and October, at Black's Tea Room, Waterloo, Iowa. H. V. Henderson, Reinbeck, Iowa, secretary.

Coon Valley Veterinary Association, the second Wednesday of each month, September through May, at the Bradford Hotel, Storm Lake, Iowa. D. I. Lee, Sac City, Iowa, secretary.

East Central Iowa Veterinary Medical Society, the second Tuesday of every month. Dr. W. T. Rugger, Oxford, secretary.

Fayette County Veterinary Association, the third Tuesday of each month, except in July and August, at Pa and Ma's Restaurant, West Union, Iowa. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Wisneslick Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

KANSAS—Kansas City Veterinary Medical Association and Kansas City Small Animal Hospital Association, the third Tuesday of each month. Robert E. Guilfoil, 18 N. 2nd St., Kansas City 18, Kansas, secretary.

KENTUCKY—Central Kentucky Veterinary Medical Association, the first Wednesday of each month. L. S. Shirrell, Versailles Rd., Frankfort, secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday evening of each month in Louisville or within a radius of 50 miles. W. E. Bewley, P.O. Box "H," Crestwood, secretary.

MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m. at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Harry L. Schultz, Jr., 9011 Harford Rd., Baltimore, Md., secretary.

MICHIGAN—Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert E. Kader, 5034 Armstrong Rd., Lansing 17, Mich., secretary.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. S. Correll, Rt. 1, Midland, Mich., secretary.

Southeastern Veterinary Medical Association, the fourth Wednesday of every month, September through May. Gilbert Meyer, 14003 E. Seven Mile Rd., Detroit 5, Mich., secretary.

MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of each month (except July and

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August), at the Coronado Hotel, Lindell Blvd. and Spring Ave., St. Louis, Mo., at 8 p.m. Chester R. Plegge, 4249 Peck St., St. Louis 7, Mo., secretary.

Kansas City Veterinary Medical Association and Kansas City Small Animal Hospital Association, the third Tuesday of each month. Robert E. Guilfoil, 18 N. 2nd St., Kansas City 18, Kansas, secretary.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April at the Academy of Medicine, 91 Lincoln Park South, Newark, N. J. Myron S. Arlein, 2172 Milburn Ave., Maplewood, N. J., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Casa Mana in Teaneck. James R. Tanzola, Upper Saddle River, secretary.

Northwest Jersey Veterinary Society, the third Wednesday of every odd month. G. R. Muller, 43 Church St., Lambertville, N. J., secretary.

Southern New Jersey Veterinary Medical Association, the third Tuesday of each month at the Collingswood Veterinary Hospital, Collingswood. W. E. Snyder, E. Kings Highway and Munn Ave., Haddonfield, secretary.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

New York State Veterinary College. Annual conference for veterinarians. Cornell University, Ithaca. W. A. Hagan, New York State Veterinary College, Cornell University, Ithaca, N. Y., dean.

Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel, Greensboro. Joseph A. Lombardo, 411 Woodlawn Ave., Greensboro, secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month, time and place specified monthly. Byron H. Brow, Box 453, Goldsboro, N. Car., secretary.

Piedmont Veterinary Medical Association, the last Friday of each month. John G. Martin, Boone, N. Car., secretary.

Twin Carolinas Veterinary Medical Association, the third Thursday of each month in the Orange Bowl Restaurant, Rockingham, N. Car., at 7:30 p.m. James R. Burgess, Rockingham, N. Car., secretary.

OHIO—Cuyahoga County Veterinary Medical Association, the first Wednesday of each month, September through May (except January), at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. Ed. R. Jacobs, 5522 Pearl Rd., Cleveland, Ohio, secretary.

Stark County Veterinary Association, the second Monday of each month. M. L. Willen, 4423 Tuscarawas St., Canton, Ohio, secretary.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month, 7:30 p.m., Patrick's Foods Cafe, 1016 N.W. 23rd St., Oklahoma City. Forrest H. Stockton, 2716 S.W. 29th St., Oklahoma City, Okla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month in Directors' Parlor of the Brookside State Bank, Tulsa, Okla. Don L. Hohmann, 538 S. Madison St., Tulsa, Okla., secretary.

PENNSYLVANIA—Del-High Veterinary Medical Association, the first Thursday of each month. Stewart Rockwell, 10th and Chestnut Sts., Emmaus, Pa., secretary.

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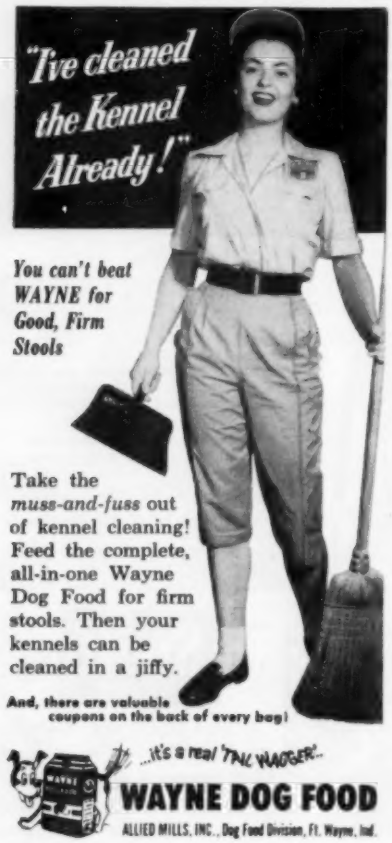
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SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. J. Marvin Prewitt, 4141 Lexington Blvd., Corpus Christi, Texas, secretary.

VIRGINIA—Central Virginia Veterinarians' Association, the third Thursday of each month at the William Byrd Hotel in Richmond at 8:00 p.m. M. R. Levy, 312 W. Cary St., Richmond 20, Va., secretary.

Northern Virginia Veterinary Society, the second Wednesday of every third month. Meeting place announced by letter. H. C. Newman, Box 145, Merrifield, secretary.

Southwest Virginia Veterinary Medical Association, the first Thursday of each month. I. D. Wilson, Blacksburg, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Monday of each month, Magnolia American Legion Hall, 2870 32nd W., Seattle, Wash. William S. Green, 9637 S. E. 36th, Mercer Island, Wash., secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. O. L. Bailey, P. O. Box 906, Olympia, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the second Thursday of each month in the Hotel Prichard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 280 5th St., W. Huntington, W. Va., secretary.

Central Wisconsin Veterinary Medical Association, the second Tuesday of each quarter (March, June, Sept., Dec.). R. J. O'Hern, P. O. Box 617, Cumberland, Wis., secretary.

Dane County Veterinary Medical Association, the second Thursday of each month. Dr. E. P. Pope, 409 Farley Ave., Madison, Wis., secretary.

WISCONSIN—Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House. Blue Mound Rd. Dr. R. H. Steinkraus, 7701 N. 59th St., Milwaukee, Wis., secretary.

Northeastern Wisconsin Veterinary Medical Association, the third Wednesday in April. William Madison, 218 E. Washington St., Appleton, Wis., secretary.

Rock Valley Veterinary Medical Association, the first Wednesday of each month. W. E. Lyle, P. O. Box 107, Deerfield, Wis., secretary.

Southeastern Veterinary Medical Association, the third Thursday of each month. John R. Curtis, 419 Cook St., Portage, Wis., secretary.

Wisconsin Valley Veterinary Medical Association, the second Tuesday of every other month. E. S. Scobell, Rt. 2, Wausau, Wis., secretary.

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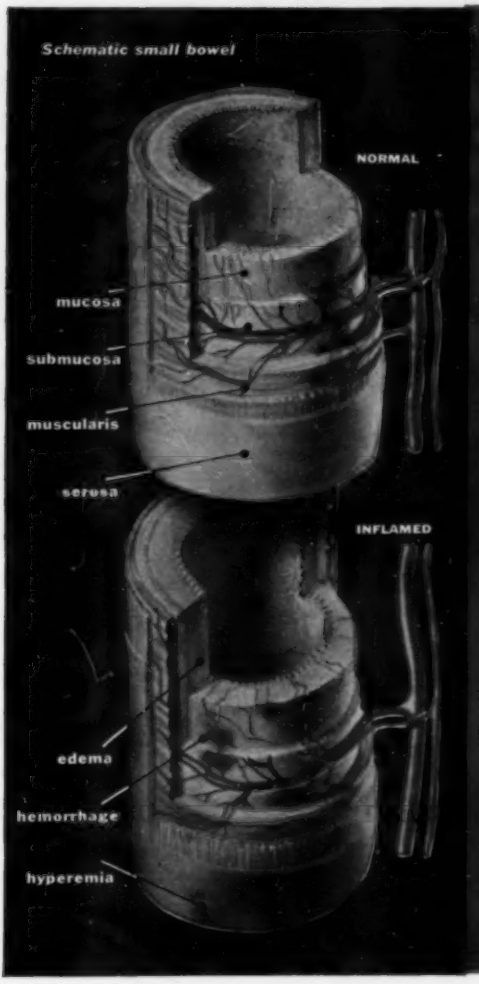

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SUSPENSION . . . pints and gallons.
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Our purpose:

to provide products of the finest quality and greatest effectiveness for the highest degree of successful veterinary practice

The wise farmer depends on the veterinarian to maintain livestock health and profits.

The great research skills and facilities of the American Cyanamid Company are as devoted and persistent in their efforts in behalf of ever more and better products for the veterinary profession as they are in the field of human medicine.

And in the production of the Veterinary Professional Line, including the POLYOTIC® Tetracycline products, Cyanamid standards of quality and effectiveness are no less stringent and exacting than those established for products for human use.

The same strict quality control is scrupulously maintained. Even packaging requirements are equal in every way.

For it is our unswerving purpose to place in the hands of veterinarians an ever-increasing number of products of unexcelled quality and proven effectiveness to help them achieve and maintain the greatest measure of success in practice.

These fine products are sold only to veterinarians.

For detailed information write to the VETERINARY PROFESSIONAL SERVICE DEPARTMENT, AMERICAN CYANAMID COMPANY, NEW YORK 20, N. Y.

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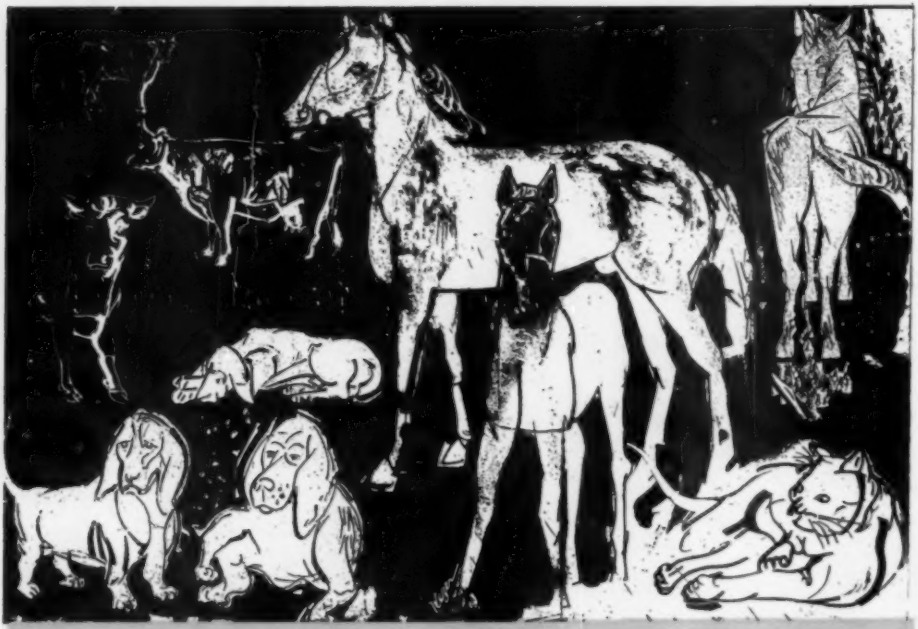

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- osteomyelitis of compound fractures

FURACIN products contain FURACIN 0.2% in water-miscible vehicles. Available as FURACIN Dressing Veterinary in jars of 4 oz. and 1 lb.; FURACIN Dressing with Anesthetic (butacaine sulfate 0.5%) in tube of ½ oz. and jar of 1 lb.; FURACIN Soluble Powder in plastic "puff" bottle of 10 Gm.; FURACIN Solution in bottles of 2 oz.; 1 pint; 1 gal. FURACIN Ear Solution in bottles of 1 fl.oz.

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brand of nitrofurfuryl methyl ether

Triple-action fungicide, sporicide, bactericide in:

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Available as FURASPOR Liquid Veterinary, containing FURASPOR 0.4%, quaternary ammonium compound 0.5%, in a water-miscible vehicle of benzyl benzoate 15% and water. Odorless and nonstaining. Bottles of 2 fl.oz. with dauber top, and 1 pint.

NOTE: FURASPOR is *contraindicated* for cats and rabbits because of the benzyl benzoate content.

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NITROFURANS—A NEW CLASS OF ANTIMICROBIALS—NEITHER ANTIBIOTICS NOR SULFONAMIDES

EATON LABORATORIES
NORWICH, NEW YORK

What Is Your Diagnosis?

A case history and accompanying photograph depicting an unusual condition appears below.

Make your diagnosis from the picture — then turn the page ▶

History.—This dog had difficulty controlling its left rear limb following a surgical procedure. The photograph, taken the second day after experimental surgery, shows a typical attitude assumed when standing.

(Diagnosis and findings are reported on next page)

Here Is the Diagnosis

(Continued from preceding page)

Diagnosis.—Adduction of the left rear limb of the dog, due to paralysis of the abductor muscles, following transection of the left obturator nerve (see page 174).

Comments.—Obturator paralysis seems rare in dogs and most other species but is occasionally seen in cattle, possibly associated with hip luxation. It is seen most frequently when animals have fallen with the hindlegs straddled, while on ice, or on a smooth, slippery floor.

Our readers are invited to submit histories, radiographs, and diagnoses of interesting cases which are suitable for publication.

This case was presented by Dr. R. P. Worthman, State College of Washington, Pullman.

Endocrine Adaptation to Tropics

Metabolic rate and thyroid activity were found to be depressed in rats, sheep, and man by periods of living at temperatures above 86 F.; food intake was reduced and water intake increased. The intake of water by man and sheep, in Australia, was 12 times as great in summer as in winter.

During evaporative body cooling in the hotter seasons, antidiuretic hormone appears in the blood to reduce urine flow, and the potassium to sodium ratio increases (within 2 hours at 104 F.). A salt-saving hormone appears earlier than the antidiuretic hormone, thus preparing the cells by increasing intracellular sodium and decreasing intracellular water.

The reproductive rate is also affected. In towns of similar population, human reproduction is lower in the hot (north) area than in the cooler (south) area. In tropical pasture area, conception rates in cows and ewes rarely is more than 60 per cent. In rabbits, large numbers of fetuses resorb if the animal is maintained at about 95 F. Research has shown that supplementary thyroid hormone, increased protein and vitamin intake, or supplementary progesterone can save a number of fetuses from resorption. Acclimatization appears to protect the fetus but this protection can be completely overcome by injections of 2 mg. of cortisone daily. Excessive mobilization of cortisone or a similar hormone could be responsible for fetal resorption.—*J.Am.-M.A. (May 18, 1957): 319.*

A Producers' Swine Disease Survey.—A questionnaire answered by about 420 of the nation's leading swine producers indicated that 38.6 per cent believed that swine diseases presented a greater problem than five years ago. Nearly half considered scours and erysipelas the two biggest problems, closely followed by pneumonia and anemia. However, more than half felt that the greatest need for research was on atrophic rhinitis, transmissible gastroenteritis, and erysipelas.

Over 80 per cent indicated that they consulted their local veterinarian for all swine troubles, even including unthrifty pigs. Most of them purchased their animal health products through their veterinarian although 21 per cent purchased them from a feed dealer, and 17 per cent from the local druggist. About 64 per cent had their vaccinating done by their veterinarian while 34.5 per cent did their own.

To control disease, 80 per cent felt there should be more forceful laws covering sale and transfer of swine. A page in the *National Hog Farmer* where swine disease problems could be discussed was approved by 97.6 per cent (Dr. L. P. Doyle of Indiana is one of the authorities consulted on this page).—*Nat. Hog Farmer (June, 1957): 1.*

There's no guessing with Jen-Sal Canine Distemper Vaccine–

- A virus proved to be highly antigenic.
- Propagated in eggs to assure highest virus concentration.
- Combined with a distinctive stabilizing agent to protect potency.
- Lyophilized by the JEN-SAL "superseal" process.

Make your move for client satisfaction in canine distemper prophylaxis. Specify this improved JEN-SAL Chick Embryo Vaccine.

Available at all JEN-SAL Branches in packages of five single doses with diluent.
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for across the board protection against canine distemper . .

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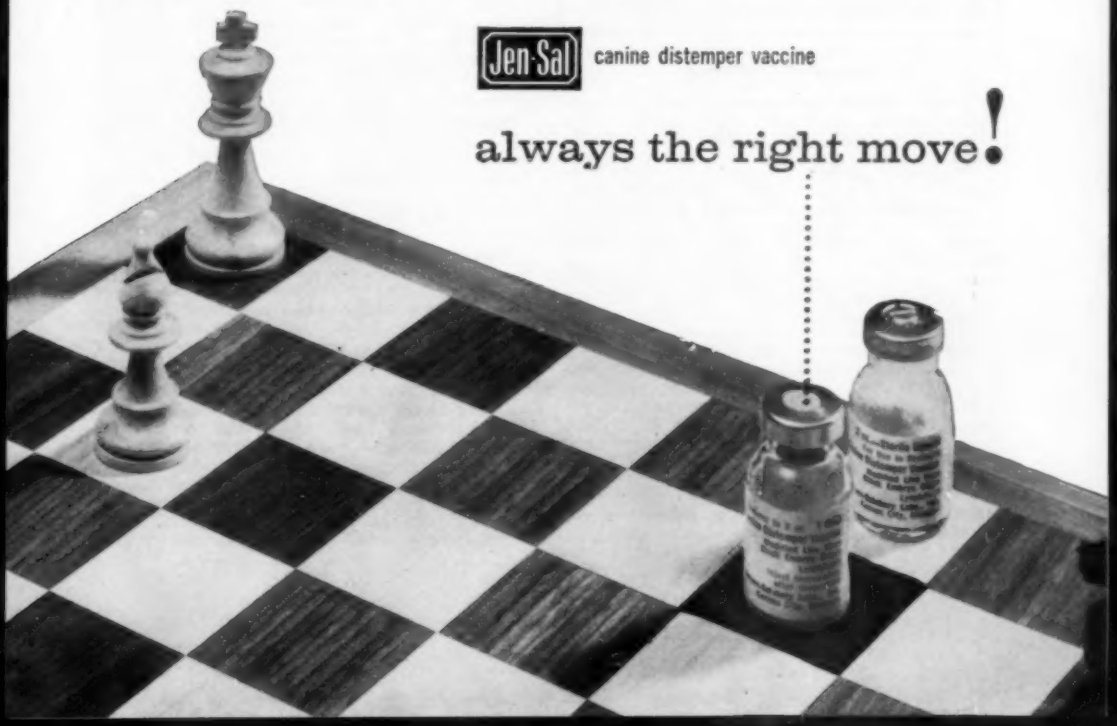
always the right move!



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Personal Want Ads—$4.00 for the first 25 words and 10 cents for each additional word; 35 cents for use of box number.

Commercial Want Ads—$5.00 for the first 25 words, 25 cents for each additional word.

Remittance must accompany ad.

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For JOURNAL dated 15th of month **— 22nd of month preceding date of issue.**

Names of classified advertisers using key letters can not be supplied. Address your reply to the key letters, c/o JOURNAL of the AVMA, 600 S. Michigan Ave., Chicago 5, Ill., and it will be transmitted to the advertiser.

Wanted—Veterinarians

Foreign veterinarian wanted to assist in small animal hospital. Married or single. Address "Box M 1," c/o JOURNAL of the AVMA.

Veterinarian wanted as assistant in modern small animal hospital in South. Salary $400.00 per month. Address "Box L 34," c/o JOURNAL of the AVMA.

Veterinarian wanted for small animal practice. Should be familiar with laboratory diagnostic procedures and licensed in Michigan. State qualifications and expected salary. Address "Box M 25," c/o JOURNAL of the AVMA.

Assistant wanted for busy small animal practice in the South; some large animals. Modern, well-equipped hospital. Salary commensurate with qualifications, with possible percentage arrangement. Address "Box M 26," c/o JOURNAL of the AVMA.

Desire recent graduate. Exclusively small animal. Salary $6,000 a year. No living quarters available. Position available Sept. 15. Must have Illinois license. Address "Box L 8," c/o JOURNAL of the AVMA.

Veterinarian wanted as assistant in general practice in Tennessee. Salary, leading to profit-sharing partnership. Address "Box M 33," c/o JOURNAL of the AVMA.

Assistant veterinarian wanted in mixed practice in upper Midwest. State references, experience, and salary expected in first letter. Address "Box M 35," c/o JOURNAL of the AVMA.

Wanted—Positions

Veterinarian, 1955 graduate, married, desires position leading to partnership in Middlewest mixed practice. Being discharged from Service, December, 1957. Address "Box M 30," c/o JOURNAL of the AVMA.

Cornell graduate, 1953, desires assistantship or position leading to partnership in small animal practice in East or Middlewest. Licensed: New York, Vermont, Michigan. Married. Being discharged from Service in October. Address: Capt. Robert Nelson, 7520th USAF Hospital, APO 125, N.Y., via air mail.

Hungarian refugee, graduate of Budapest Univ., 1936, desires position in mixed practice. Address inquiries to Dr. Stewart R. Rockwell, 225 Macungie Ave., Emmaus, Pa.

Danish veterinarian desires position as assistant to American veterinarian, who will be sponsor. Age 31, married, one child, 1951 graduate of the Royal Veterinarian Institute of Copenhagen. Experienced in mixed practice and in insemination and fertility. Please write Kaj Scheffmann, Engvej 4, Maribo, Denmark.

Wanted—Practices

Partner in large group practice, six years intensive practice experience, wants to buy smaller ($15,000-$20,000 gross), well-established pet and dairy practice. Will pay cash. Address "Box M 28," c/o JOURNAL of the AVMA.

Married veteran, experienced, desires to purchase or option to buy a going, modern small animal practice in Missouri, Kansas. Address "Box M 32," c/o JOURNAL of the AVMA.

For Sale or Lease—Practices

Completely equipped boarding kennel for sale; fine clientele. Separate building for veterinary office; partially furnished two bedroom, two bath, river front home. No veterinarian in this growing community, near Ellinor Village. Mr. & Mrs. H. W. Beatty, Box 123, Ormond Beach, Florida.

Veterinary clinic for sale in Ohio, between Cleveland and Akron. Space for 50 animals; outside runs. Office, operating room, new 5-room house, large parking area; good location. Price: $25,500. $8-10,000 down payment required, with balance payable at $85.00 per month, 5% interest included. Address "Box M 5," c/o JOURNAL of the AVMA.

(Classified ads continued on page 52)

infected eyes and ears respond rapidly to

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Brand of nitrofurazone

Wide-spectrum, non-irritating nitrofuran in formulations especially adapted for the treatment of bacterial infections of the

eye

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SOLUBLE POWDER VETERINARY

"FURACIN in its water-soluble base is completely soluble in body fluids. These properties make it ideally suited for the treatment of ophthalmitis and postoperative therapy."*

FURACIN Soluble Powder Veterinary is conveniently applied directly from the plastic puff-bottle.

These FURACIN products contain FURACIN 0.2% in water-miscible vehicles. Therefore, they may be left in wounds to be sutured.

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Available through your professional veterinary distributor.

ear

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Available in dropper bottle of 1 fl.oz.

*Belloff, G. B.: Calif. Vet. 9:16 (Nov.-Dec.) 1956.

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EATON LABORATORIES NORWICH, NEW YORK

Fully equipped hospital for sale in Los Angeles, California area. 3-room apartment available next door. Ideal mixed practice. $7,000 down will handle. Owner retiring. Address "Box M 27," c/o JOURNAL of the AVMA.

Growing general practice in western Pennsylvania for sale; one-half small animal and one-half large animal. Community of 20,000. Reasonably priced. No real estate. Address "Box M 31," c/o JOURNAL of the AVMA.

For sale—the only small animal hospital in prosperous Fox River Valley of Wisconsin. Finest building and property north of Milwaukee. Present owner single, and returning to school on fellowship. Must sell soon, at less than cost of duplication; $32,000, fully equipped: x-ray, electric cautery, office equipment, etc. Practice growing, only four years old. Excellent opportunity to do general practice in heart of America's dairy land. Ideally located half-mile from Appleton. Land contract available, or ½ down, and will personally accept balance on first mortgage. Address inquiries: Dr. J. C. Hruska, Valley Veterinary Clinic, Rt. 1, Appleton, Wis.

Well-established general practice, located in coastal bend area Texas, for sale. Building leased in central business district in city of 8,500 population. Services extend to towns of 2,800, 2,500, 1,200, and 1,400 population, without resident practitioners in eleven mile radius. Great deal of large animal practice in surrounding area. For full details address "Box M 29," c/o JOURNAL of the AVMA.

Business Opportunities

Laboratory supply franchise, wholesale physician, veterinary, hospital supplies, solutions; 4-state franchise, $55,000 stock; 1956 sales $115,000; Pennsylvania; price $70,000. Apple Company, 1836 Euclid, Cleveland, Ohio.

Miscellaneous

3½-year old Motorola base and mobile communication equipment for sale; in very good condition. Price: $1,100, FOB, Wisconsin. Address "Box M 34," c/o JOURNAL of the AVMA.

Pregnancy diagnosis in mares—45th to 150th day. Request mailing tubes; $7.00, 2 or more, $6.00 each. Pregnancy Diagnostic Laboratories, Dysart, Iowa.

Artificial Udder—Beco Litter Feeder—nurses 8 puppies simultaneously. Stays warm; easily cleaned and sterilized. Complete unit, $15; guaranteed. Breeders Equipment Co., Flourtown, Pa.

Breedersleve—the disposable obstetrical sleeve. Package of 25 with detachable chest band, $5.00; lower wholesale prices. Free sample upon request. Breeders Equipment Co., Flourtown, Pa.

Too Late to Classify

Veterinarian wanted to assist in general practice in coastal area in New England; 70% small animals, 30% large. Good future possibilities. Address "Box M 36," c/o JOURNAL of the AVMA.

D.V.M., M.S., Ph.D. desires research position in a progressive commercial or institutional organization. Association with experienced workers is preferred. Full information supplied to those interested. Will be available for interview during AVMA Convention. Contact may be made at Auditorium Hotel. Or address "Box M 37," c/o JOURNAL of the AVMA.

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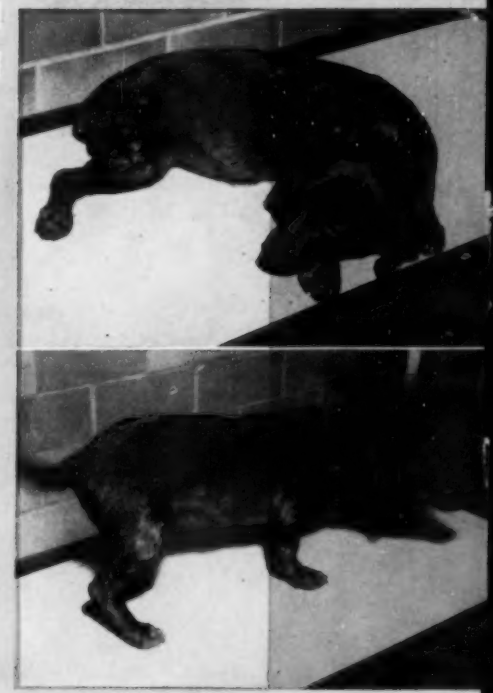
dramatic relief

for posterior paralysis and other lamenesses in dogs of all ages



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Butazolidin (Jen-Sal) brings to veterinary practice outstanding antiarthritic, anti-inflammatory, antipyretic and analgesic action in convenient tablet form. Already preferred in human medicine for its wide range of usefulness, Butazolidin's merit in the treatment of canine musculoskeletal disorders has now been definitely established by extensive clinical evaluation and research.

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Order Butazolidin in jars of 100 tablets from your nearest Jen-Sal Branch.

[1]J.A.M.A., 155, 17, Aug. 21, 1954
[2]Burns, J.J., Schulert, A., Chenkin, T., Goldman, A., and Brodie, B.B.: J. Pharmacol. & Exper. Therap., 100, 530, 1952
[3]Lieberman, L.L.: J. Am. Vet. M.A., 125, 128, 1954
[4]Joshua: Vet. Rec., Jan. 21, 1956
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